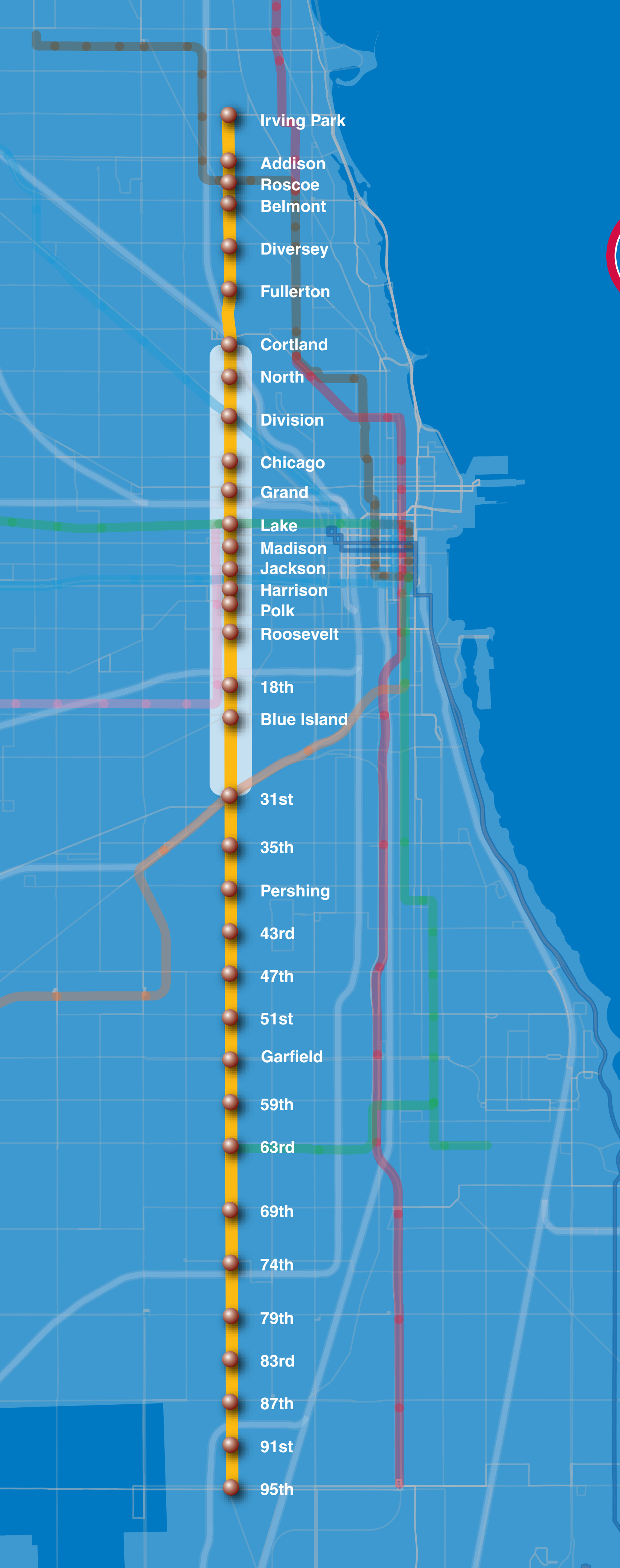

cta

in partnership with

CDOT
CHICAGO DEPARTMENT
OF TRANSPORTATION

Chicago Department of
HOUSING and
ECONOMIC
DEVELOPMENT

Environmental Assessment

Ashland Bus Rapid Transit

November 2013

Prepared for: The Federal Transit Administration

U.S. Department of Transportation
Federal Transit Administration

Prepared by CDM Smith

Ashland Avenue
Bus Rapid Transit Project

Environmental Assessment

November 14, 2013

Ashland Avenue Bus Rapid Transit Project
City of Chicago, IL
Cook County, IL

Environmental Assessment

Submitted pursuant to the 42 U.S.C. 4332 (2)(c) by the
U.S. Department of Transportation Federal Transit Administration
and the
Chicago Transit Authority

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EXECUTIVE SUMMARY

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), and as a grantee of the Federal Transit Administration (FTA), is proposing to implement an approximately 16.1-mile long Bus Rapid Transit (BRT) service along Ashland Avenue in the City of Chicago to improve transit speeds and reliability and enhance the pedestrian environment. The project corridor extends north-south along Ashland Avenue from Irving Park Road in the north to 95th Street in the south. Physical improvements proposed include dedicating two general use travel lanes (one in each direction) as center running bus-only lanes, implementation of transit signal priority (TSP), and construction of median BRT stations with enhanced pedestrian amenities approximately every half mile and at CTA "L" stations. This Environmental Assessment (EA) documents the effects of implementing these improvements along the entire 16.1-mile project corridor.

Phase 1 of the project would implement center running, dedicated bus-only lanes and median stations first along 5.4 miles of Ashland Avenue between Cortland Street in the north and 31st Street in the south, generally within the central portion of the full 16.1-mile project. Outside of the Phase 1 limits, the BRT service would operate in mixed flow traffic and make stops curbside at the BRT station locations, using existing curbside local bus stops for the remainder of the 16.1-mile corridor. The second phase of the project would be implemented commensurate with funding availability. An implementation plan for the two project phases is discussed within this report (see **Section 2.3**).

This EA has been developed to meet the requirements of the National Environmental Policy Act of 1969 (NEPA) and concentrates on a detailed assessment of social, economic, and environmental impacts. It also recommends mitigation measures for any identified adverse impacts. In coordination with the public involvement process, the EA helps to define the effects of implementing the Ashland Avenue BRT Project on the physical, human, and natural environments along the corridor and surrounding station locations.

The selection of this center running, travel lane removal alternative as the Preferred Alternative (the Build Alternative in this EA) was based on a year-long Alternatives Analysis (AA) effort that assessed more than 16 options for BRT on Ashland Avenue. After a multi-level screening analysis and input at six public open houses, center running BRT with the removal of one travel lane in each direction was identified as the Preferred Alternative. Construction of the project is planned in phases to focus capital resources and provide a sustainable, viable, and long-term transit solution in the corridor.

Purpose and Need

The purpose of the Ashland Avenue BRT Project is to expand connectivity to the region's existing transit system by providing a new and upgraded high quality, high capacity, and cost effective premium transit service, i.e., a service which provides faster, more reliable, and comfortable passenger experience in comparison to the current local bus service. The proposed project would address the transportation needs of expansive population and employment growth outside of the Chicago Central Business District (CBD) or "Loop" and support local and regional land use, transportation and economic development initiatives. Specifically, the project would improve accessibility, mobility, transit travel times and reliability, and passenger facilities in this heavily transit-reliant corridor.

The need for this project is based on the following issues:

- Regional growth patterns outside of Chicago’s “Loop”
- Congestion and a lack of competitive travel options
- Large number of transit-dependent customers
- Lack of non-downtown north-south fast transit alternatives
- Slow bus speeds, frequent stops, and unreliable bus travel times
- Street design issues no longer meet corridor needs or land use policy objectives

Environmental Resources, Impacts and Mitigation

The anticipated environmental impacts of the Ashland Avenue BRT Project are summarized in the **Table ES-1**. This EA provides greater details on each of these areas. The No-Build Alternative, which does not include any improvements other than routine maintenance of the existing bus service, was eliminated early on in the AA phase for not meeting the purpose and need for this project. Nevertheless, the No-Build Alternative is considered in the EA as a baseline against which the Preferred Alternative (Build Alternative) is compared. Throughout the EA, for each resource evaluated, both the potential impacts of the Preferred Alternative and the No-Build Alternative are discussed. **Table ES-1** summarizes the potential impacts of the Ashland Avenue BRT Project.

Table ES-1: Summary of Impacts

Factor	No-Build Alternative	Build Alternative
Vehicular Traffic - Diversion Routes	No Impact	Moderate Impact. Increased volumes on parallel routes and minimal travel speed reductions (between 1 and 3 percent on average daily).
Vehicular Traffic - Ashland Avenue	No Impact	Moderate Impact. Decreased volumes on Ashland Avenue. Limited left turns. Thirteen out of 89 signalized intersections along the corridor would operate at unacceptable Level of Service (LOS) without mitigation measures. Six of these 13 signalized intersections on the corridor are already performing at LOS E or F in existing conditions. Seven of these 13 signalized intersections currently operate at LOS D or better. Mitigation measures involving improvements either inside or outside of existing curb-to-curb width have been identified for all 13

Factor	No-Build Alternative	Build Alternative
Vehicular Traffic - Ashland Avenue		intersections which would bring all of these intersections up to acceptable LOS. CTA and CDOT would continue, as project partners, to work through final design on mitigation options for these failing intersections.
Parking	No Impact	Minor Impact. Approximately 11 to 12 percent reduction in parking capacity. This is offset by lack of demand in some areas along the corridor and available, comparable parking on side streets. Comparable parking would continue to be available at cross streets near BRT stations to serve residents and businesses. Outside of station areas, on-street parking would be retained and no loading zones would be impacted. Any additional changes to parking would be identified and coordinated through the public involvement process and with CDOT and the City of Chicago as part of stakeholder outreach efforts in final design.
Transit Operational Analysis	No Impact	Positive Impact. Up to 83 percent increase in bus speeds compared to local bus. Improvement of bus on-time reliability by 50 percent compared to local bus. Ridership is projected to increase by approximately 29 percent.
Bicycle & Pedestrian	No Impact	Positive Impact. Implementation of the Build Alternative is expected to benefit pedestrians and bicyclists by providing a new transit option that would encourage walk and bike trips, and improve the pedestrian environment. In addition, the design of the project would provide pedestrian-friendly features such as curb extensions that would slow down traffic and make crossing the street safer and easier. This would help in creating a system that benefits all users of the transportation system. Finally, much of the corridor would connect with current or planned DIVVY bike share stations.
Displacements/ Relocations	No Impact	No Impact

Factor	No-Build Alternative	Build Alternative
Land Use & Economic Development	No Impact	Consistent with existing land use and minor positive impact to economic development.
Neighborhoods & Communities	No Impact	Minor Positive Impact. BRT facilities would complement area neighborhoods. Physical layout would improve pedestrian access and transit service along and throughout the corridor which would enhance community cohesion. Improvements at intersections would also help reduce the dividing effect between neighborhoods along Ashland Avenue. Designs would be sensitive to emergency service access needs in the corridor.
Environmental Justice	No Impact	No Impact
Historical & Archaeological Resources	No Impact	No Impact
Parkland & Recreational Resources	No Impact	No Impact
Visual Quality	No Impact	No Impact
Noise & Vibration	No Impact	Minor Impact. A maximum operational BRT scenario was used to measure potential impacts of this project. Based on the anticipated frequency and speed of the proposed BRT service, the project is not expected to result in any severe noise impacts. Also, noise levels are not expected to increase greatly due to the removal of one general use travel lane in each direction. Vibration impacts associated with rubber-tired vehicles are not expected.
Air Quality	No Impact	Minor Positive Impact. The net effect of the project would reduce net emissions for all pollutants.
Water Resources	No Impact	No Impact
Biological Resources	No Impact	No Impact
Geology & Soils	No Impact	No Impact

Factor	No-Build Alternative	Build Alternative
Hazardous Materials	No Impact	No Impact
Energy	No Impact	Minor Impact. The new stations would consume additional energy; as part of conceptual planning, potential offsets of energy use at stations such as solar panels and the use of LED lighting are being considered. Reduced Vehicle Miles Traveled (VMT) would reduce energy consumption citywide.
Safety & Security	No Impact	No Impact
Temporary Construction	No Impact	Minor impact. Best management practices and the appropriate erosion and sediment control measures would be employed during construction to offset potential temporary noise, vibration, light, and dust emissions.
Indirect & Cumulative	No Impact	No Impact

Opportunity for Public Comment

A 30-day public comment period has been established to receive comments on this document. Copies of the EA are available at CTA's website (www.transitchicago.com/ashlandbrt), at CTA headquarters, and at the following library locations along the corridor:

- Lincoln Belmont, 1659 W. Melrose Street, Chicago, IL 60657
- West Town, 1625 W. Chicago Avenue, Chicago, IL 60622
- Lozano (Pilsen), 1805 S. Loomis Street, Chicago, IL 60608
- West Englewood, 1745 W. 63rd Street, Chicago, IL 60636
- Harold Washington Library Center, 400 S. State Street, Chicago, IL 60605

Two public hearings are scheduled to solicit comments from the community about the EA. Meeting locations as well as dates and times for these meetings can be found on CTA's website (www.transitchicago.com/ashlandbrt).

Comments received during the public hearings will be submitted to the FTA and entered into public record. In addition, written comments may be submitted at any time during the public comment period. These written comments may be submitted either electronically to AshlandBRT@transitchicago.com or by U.S. mail to:

Chicago Transit Authority
Attn: Joe Iacobucci
567 W. Lake Street
Chicago, IL 60661

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1. PURPOSE AND NEED

This chapter describes the purpose of this Environmental Assessment (EA) for the Ashland Avenue Bus Rapid Transit (BRT) Project, the background and context under which this project has evolved, and defines the purpose and need for the project.

1.1 Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), and as a grantee of the Federal Transit Administration (FTA), is proposing to implement an approximately 16.1-mile long BRT service along Ashland Avenue in the City of Chicago, Illinois to improve transit speed and reliability and enhance the pedestrian environment. The project corridor, located 1.5 miles west of Chicago’s Central Business District (CBD) or “Loop”, extends north-south along Ashland Avenue from Irving Park Road in the north to 95th Street in the south.

Physical improvements proposed for this project would include dedicating two general travel lanes (one in each direction) as center running bus-only lanes, implementation of transit signal priority (TSP), and construction of median BRT stations with enhanced pedestrian amenities approximately every half mile and at CTA “L” stations. Most parking and existing landscaped medians would be maintained, and new landscaped medians between stations would be provided where none currently exist. Left-hand turns would be restricted at most locations along the corridor to improve transit speed, general traffic flow, and transit service reliability.

The Ashland Avenue BRT Project would be constructed in two phases. Phase 1 of the project would implement center running, dedicated bus-only lanes and median BRT stations first along 5.4 miles of Ashland Avenue between Cortland Street in the north and 31st Street in the south, generally within the central portion of the 16.1-mile project (Phase 1). Outside of the Phase 1 limits, the BRT service would initially operate in mixed flow traffic and make stops at the BRT station locations, using existing curbside local bus stops for the remainder of the 16.1-mile corridor until the subsequent phase is implemented. Corridor design in the subsequent phase would be similar to that in Phase 1. The next phase (Phase 2) of the project would be implemented commensurate with funding availability. An implementation plan for the two proposed project phases is discussed within this report (see **Section 2.3**). This EA documents the effects of implementing the full project (Phases 1 and 2) along the entire 16.1-mile project corridor.

The Ashland Avenue BRT Project would provide a new, reliable, transit service along CTA’s most utilized bus corridor (which carries over 31,000 riders per weekday) and would provide enhanced regional connectivity to and from a number of existing transit bus and rail services that intersect Ashland Avenue. The project would provide a new premium transit service, i.e., a service which provides faster, more reliable and comfortable passenger experience in comparison to the current local bus service. Implementation of BRT service along the Ashland Avenue corridor is planned as part of a citywide BRT initiative consistent with the goals and objectives outlined in the Chicago Metropolitan Agency for Planning’s (CMAP’s) 2040 regional long range transportation plan (*GO TO 2040*). The initiative has evolved through a series of studies, and has most recently been featured in the Mayor’s Chicago 2011 Transition Plan and the Metropolitan Planning Council 2011 report, *Integrating Livability Principles into Transit Planning: An Assessment of Bus Rapid Transit Opportunities in Chicago*.

The National Environmental Policy Act of 1969 (NEPA) mandates the consideration of environmental impacts prior to approval of any federally funded project that may have significant impacts on the environment or where impacts have not yet been determined. The NEPA process provides a transportation planning decision making framework to consider the purpose and need for a proposed action and identify potential design solutions, project costs, and relative benefits of the proposed action. This Ashland Avenue BRT Project EA has been prepared in accordance with NEPA and other applicable regulations under the "NEPA Umbrella," including Section 106 of the National Historic Preservation Act (NHPA), Section 4(f) of the United States Department of Transportation Act of 1966, joint guidance and regulations from FTA and the Federal Highway Administration (FHWA), and other agency regulations and guidelines.

This Ashland Avenue BRT Project EA concentrates on a detailed assessment of social, economic, and environmental impacts and recommends mitigation measures for any identified adverse impacts. The EA explores, in coordination with the public involvement process, the effects of implementing the Ashland Avenue BRT Project on the physical, human, and natural environments along the corridor and surrounding station locations. Following consideration of the EA, along with comments received through public outreach and agency coordination, the FTA will issue a finding on the proposed project based on the significance of impacts identified during the process. The finding will guide future planning and implementation of the project. If the FTA concludes on the basis of this EA and public input that the project qualifies for a Finding of No Significant Impact (FONSI), then the project would become eligible to advance into later phases of project development and construction.

1.2 Project Background

With over 10 million transit boardings in 2012 (over 31,000 daily transit trips), the Ashland Avenue corridor just west of Chicago's downtown Loop contains medium to high density neighborhoods and major employment centers that have created transportation challenges and opportunities.

The most recent Chicago Metropolitan Agency for Planning (CMAP) data was utilized to obtain major demographic characteristics of the corridor. There are currently over 90,000 households and over 232,000 people that live within a half mile of the Ashland Avenue corridor, which translates to approximately nine percent of the population of Chicago. While Chicago itself is characterized by dense, urban development, the number of people per acre living within a half mile of Ashland Avenue (21.2 people per acre) is greater than the city as a whole (17.1 people per acre).[1] In addition to these demographic factors, Ashland Avenue is also one of the few continuous north-south four-lane roadways that extends throughout the majority of the city and therefore serves as a major arterial for automobile and truck traffic. As a result, commuting patterns are a major source of travel demand in the corridor and travel speeds are slow for both vehicular traffic and local bus service.

Approximately one in four households along this corridor does not have an automobile. Passengers traveling via the current local bus service are subject to slow travel speeds (approximately 8.7 miles per hour during peak periods) and frequent stops (148 stops northbound and 148 stops southbound). By 2040, it is anticipated that there will be almost

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[1] 2009 Chicago Metropolitan Agency for Planning (CMAP), Travel Demand Model TAZ Data for 2010.

287,000 people living within a half mile of the Ashland Avenue corridor, further exacerbating these travel demands.[2]

In addition to residential density, there are over 133,000 jobs in the corridor which influence commuting patterns and travel demands. Major employment hubs, regional entertainment venues, educational institutions, community facilities, industrial corridors, and a variety of retail establishments are located along Ashland Avenue. Most notably, the Illinois Medical District (IMD) is located in the central portion of the project corridor. This district serves as an economic cluster of health care jobs in the region. Covering 560 acres and employing over 20,000 workers, the IMD is the nation's largest urban medical district and includes the largest college of medicine. The IMD is also the State of Illinois' largest biotechnology/medical complex and is as an economic engine in the state, generating $3.3 billion in economic activity.[3] Other notable activity generators and job attractors along the corridor include various industrial corridors, the United Center Arena, home to the Chicago Blackhawks and Chicago Bulls, as well as Malcolm X College and 99 grammar and high schools.

Contributing to these major job attractors are a number of economic development initiatives underway in the City of Chicago that have shaped development over time, and which further support the need for multimodal transportation solutions in the corridor. The Ashland Avenue corridor intersects with 20 of the city's 160 Tax Increment Financing (TIF) districts. TIF is a special funding tool used by the City of Chicago to promote public and private investment across the city.[4] Within a TIF district, the amount of property tax the area generates is set at a base amount. As property values increase, all property tax growth above that amount can be used to fund redevelopment projects within the district. The majority of these TIF districts are focused on mixed use residential and commercial development and encompass most retail oriented streets intersecting Ashland Avenue. In addition to these mixed-use focused TIF districts, there are also five industrial corridor TIF districts that are concentrated near the three major freight rail lines and three interstate highways that pass through the corridor. The Ashland Avenue corridor also intersects three previously designated Empowerment Zones and two of the city's three Enterprise Communities, where targeted promotion of economic development and job creation have been implemented to revitalize once blighted areas. The Empowerment Zones/Enterprise Communities program is a federal, state, and local government partnership for stimulating comprehensive renewal, particularly economic growth and social development, in distressed urban neighborhoods across the nation.[5] Combined, these areas provide a number of tax and business incentives in the corridor that support the current and planned land use and transportation environments.

At the same time, from a regional perspective, CTA rail ridership has increased to its highest levels in over 50 years, and demand for access to high-speed and high-reliability transit is a key driver for this ridership growth. While the city's radial rail lines serve the region well, better options to move people quickly and reliably north and south between and connecting to these rail lines within the corridor do not currently exist.

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[2] 2010 Decennial Census (Summary File 1), 2010 American Community Survey (five-year summary), and CMAP 2009 Travel Demand Model TAZ data for 2010 and 2040.

[3] Illinois Medical District Commission. *Facts and Figures*, http://www.imdc.org/about/facts-figures, September 2012.

[4] City of Chicago, Tax Increment Financing Program, http://www.cityofchicago.org/city/en/depts/dcd/supp_info/tax_increment_financingprogram.html.

[5] U.S. Department of Housing and Urban Development, Community Renewal Initiative, http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/economicdevelopment/programs/rc

With all of these factors in mind, a number of studies have been conducted over the last decade to identify potential solutions for addressing travel demands along Ashland Avenue that would support residential and commercial growth in the corridor, provide enhanced mobility options, and support regional livability and economic development goals. Collectively, the prior studies pointed toward the merit of additional transit investment in the form of BRT along Ashland Avenue. This project is envisioned to support a larger, regional BRT initiative already underway in the city to provide cost-effective, premium transit service that can complement and enhance the existing regional transit system to accommodate the needs of residents, businesses, and tourists alike.

In July 2010, the CTA applied to the FTA for an Alternatives Analysis (AA) grant to plan for BRT investments in the Western and Ashland Corridors, and was awarded funding in the amount of $1.6 million in December 2010. In partnership with CDOT, the Chicago Department of Housing and Economic Development (DHED), and FTA, CTA conducted a year-long planning effort to assess a variety of options for BRT on both corridors. After analysis and input at six public open houses, center running BRT with the removal of one travel lane in each direction was identified as the Preferred Alternative design. The Ashland Avenue corridor was selected for further environmental evaluation and conceptual development in this EA. Construction of the project is planned in phases to focus capital resources and provide sustainable, viable, and long-term transit solutions in the corridor.

1.3 Needs to be Addressed

The following list includes the issues, constraints, and opportunities associated with the existing Ashland Avenue corridor that are proposed to be addressed by this project:

1. *Regional Growth Patterns Outside of Chicago's Loop:* Development in recent decades has resulted in major regional activity generators located along the corridor and outside of the CBD, such as the IMD employment hub, United Center Arena, Malcolm X College, and 99 grammar/high schools.

2. *Congestion and a Lack of Competitive Travel Options:* With over 232,000 residents and over 133,000 jobs, commuting patterns are a source of significant travel demand in the corridor. Transit options are limited in the corridor (Bus Route #9) and travel times are slow for both existing vehicular traffic and bus service.

3. *Large Number of Transit-Dependent Customers:* Approximately one in four households within a half mile walking distance of the corridor do not have access to an automobile and rely solely upon public transportation to meet their transportation needs.

4. *Lack of Non-Downtown, North-South, Fast Transit Alternatives:* While demand for access to rail service is up to its highest levels in 50 years as of 2012 (with over 231 million rides in 2012)[6], no fast, efficient north-south transit services are offered in the corridor to provide fast, efficient commuter access to these regional rail services. Despite the large ridership in the corridor, comparative commute times indicate that public transit does not currently provide a competitive travel option compared with the automobile.

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[6] City of Chicago, Press Release: *CTA Ridership Reaches Highest Levels in 22 Years*.
http://www.cityofchicago.org/city/en/depts/mayor/press_room/press_releases/2013/january_2013/cta_ridership_reacheshighestlevelin22years.html

5. *Slow Bus Speeds, Frequent Stops, and Unreliable Bus Travel Times:* Existing local bus service along Ashland Avenue has the highest ridership demand in the CTA bus network but currently operates at slow speeds (averaging 8.7 miles per hour during peak periods), with unreliable bus travel times due to frequent stops and buses that share travel lanes with vehicular traffic.

6. *Street Design No Longer Meets Corridor Needs or Land Use Policy Objectives:* Development of a design that considers all users of the transportation system whether automobiles, buses, bicyclists or pedestrians (known as a “complete street” design) is needed to support land use and economic development goals and objectives and to provide transportation solutions in the corridor which effectively consider all modes and all users. Cost effective investments in premium transit service to maximize use of the existing corridor right-of-way and support infill and redevelopment efforts are necessary to meet existing demands and future growth.

1.4 Project Purpose

The purpose of the Ashland Avenue BRT Project is to expand connectivity to the region’s existing transit system by providing a new and upgraded high quality, high capacity and cost effective premium transit service, i.e., a service which provides a faster, more reliable, and comfortable passenger experience. The proposed project would address the transportation needs of expansive population and employment growth outside of the Chicago CBD or “Loop” and support local and regional land use, transportation and economic development initiatives. Specifically, the project would improve accessibility, mobility, transit travel times and reliability, and passenger facilities in this heavily transit-reliant corridor.

This project purpose and need was developed through the AA process in coordination with public and agency outreach efforts to guide the development of alternatives. Throughout this year-long public engagement process, the purpose and need continued to evolve, incorporating and addressing comments and feedback from agencies and the public, and was used as an evaluation measure in identifying the proposed action for further environmental evaluation in this EA. Detailed information on the development of the purpose and need for the project may be found in **Appendix A-1**. The purpose of the project is based on the following five key purpose statements aimed at addressing the needs for the project:

1. Strengthen north-south connections to CTA and Metra’s transit network outside of the CBD to improve regional, neighborhood, and job connectivity.

2. Improve reliability, travel speed, and ease of use.

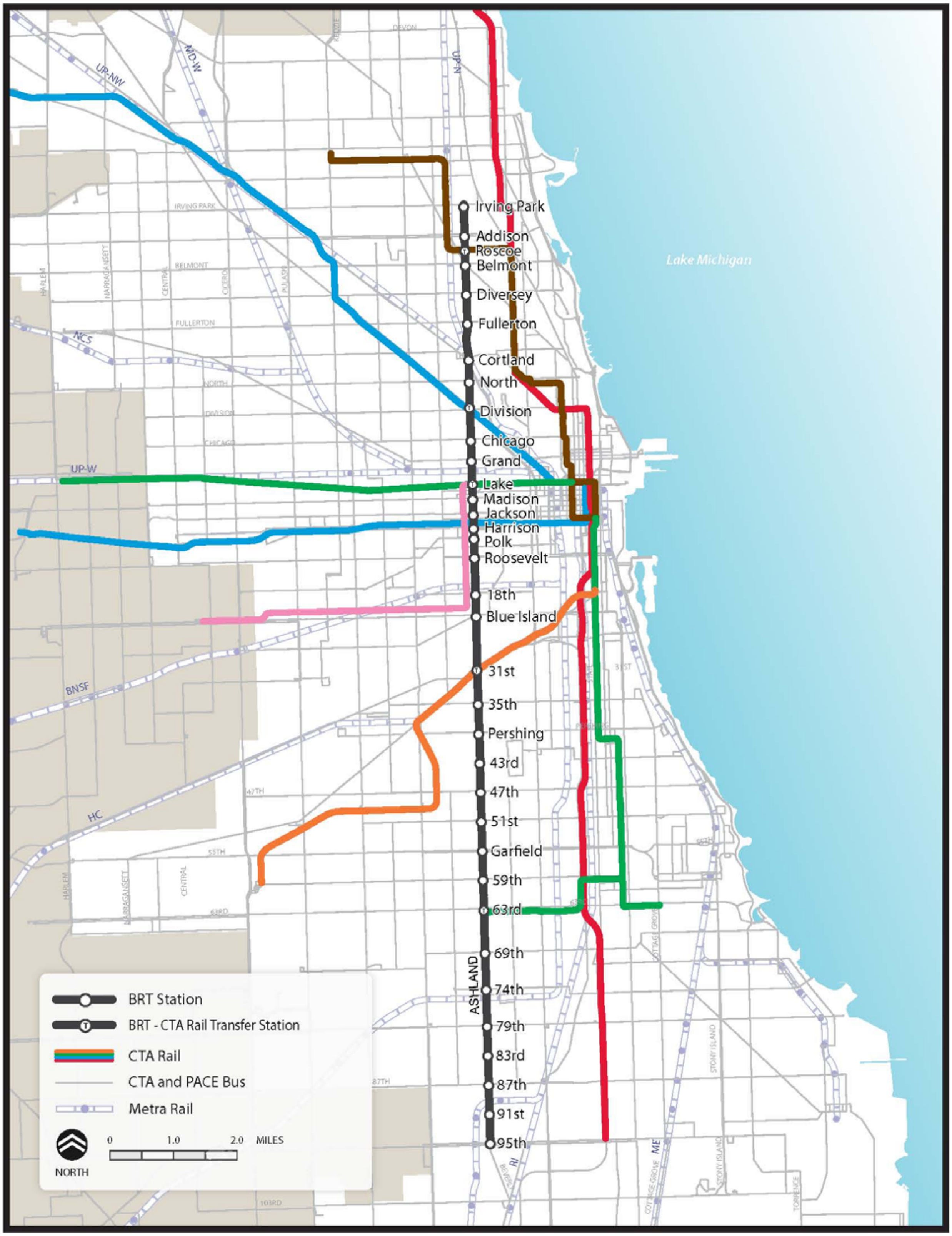
3. Meet city–regional livability and mobility goals.

4. Support transportation, land use, and economic development goals in the city and region.

5. Effectively address both physical and financial constraints for infrastructure improvements while accommodating existing development and anticipated growth.

Implementation of the Ashland Avenue BRT Project is proposed to introduce a new cross-town, north-south center running transit way approximately 1.5 miles west of Chicago’s CBD or “Loop” along 16.1 miles of Ashland Avenue, from Irving Park Road in the north to 95th Street in the south (see **Figure 1-1**).

Figure 1-1: Study Area Overview Map



BRT articulated buses, which would provide enhanced passenger capacity, are proposed to operate approximately every five to 15 minutes along the existing right-of-way in center running, dedicated bus-only lanes for the majority of the alignment. One general purpose travel lane in each direction would be repaved and striped as dedicated bus-only lanes to accommodate the BRT service. Median BRT stations with enhanced pedestrian amenities are proposed at 35 intersections along the corridor, one roughly every half mile and at all CTA "L" stations. New landscaped medians would be constructed between stations where medians do not currently exist.

Transit signal priority (TSP) improvements at all signalized intersections are also proposed in combination with the BRT service to allow more efficient traffic movements and queue jumps to provide buses priority at select intersections. These TSP and BRT service improvements are being proposed to increase bus travel speeds, which are projected to increase up to 83 percent, and enhance reliability on CTA's highest ridership bus route.

The following proposed improvements would be implemented within the existing roadway right-of-way:

- Construction of median BRT stations with shelters and pedestrian boarding areas,
- Upgrade of traffic signal systems to include TSP,
- Implementation of queue jumps and turn restrictions at certain intersections,
- Removal of one general purpose travel lane in each direction to accommodate a designated bus-only lane in each direction, and
- Streetscape improvements including medians, landscaping, and Americans with Disabilities Act of 1990 (ADA) accessibility upgrades.

These improvements in the corridor are proposed to serve residents and commuters alike by providing more efficient access to major activity generators within the project area, such as the IMD (one of the largest concentrations of jobs in the region) and improving regional transit access to a number of CTA "L" stations, Metra commuter rail stations, and bus routes intersecting or adjacent to the corridor.

Conceptual engineering details on the proposed alignment and configuration of stations, as well as considerations for proposed physical and operational improvement options can be found in **Chapter 2** of this EA.

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2. ALTERNATIVES CONSIDERED

This chapter presents the alternatives considered in this Environmental Assessment (EA) for the Ashland Avenue Bus Rapid Transit (BRT) Project: a No-Build (No Action) Alternative and the Build Alternative. A summary of the year-long Alternatives Analysis (AA) process that preceded this study and led to the identification of the Build Alternative and comparative No-Build Alternative is also provided.

2.1 Alternatives Development Process

The Chicago Transit Authority (CTA), in partnership with the Chicago Department of Transportation (CDOT), Chicago Department of Housing and Economic Development (DHED), and the Federal Transit Administration (FTA), recently completed a year-long AA to assess options for BRT on both the Ashland Avenue and parallel Western Avenue corridors. At the beginning stages of this process, extensive public and stakeholder outreach and detailed planning and traffic engineering analysis of existing conditions identified issues and opportunities along the corridors. This also helped to develop specific purpose and need statements and quantitative goals and objectives to guide subsequent alternatives analysis and decision-making. A two-level detailed screening process was used to evaluate the Alternatives and to identify the Preferred Alternative, which is the Build Alternative under evaluation in this EA. Detailed documentation on the Screen 1 and Screen 2 reports can be found in **Appendices A-2** and **A-3,** respectively.

For the purposes of the Screen 1 Evaluation, a No-Build Alternative, Transportation Systems Management (TSM) Alternative involving minimal improvements to existing services, and 16 Build Alternative concepts were developed. The TSM Alternative considered implementing TSP and reinstituting previous express bus service along the corridors (previously known as the □X9 Ashland Express and the □X49 Western Express routes). The BRT Build Alternatives considered a variety of lane configuration designs to accommodate BRT, including: curbside bus-only lanes, center bus-only lanes, reversible center lane strategies, barrier separated bus-only lanes, as well as two-way adjacent bus-only lanes. All alternatives assumed the ability to implement the BRT project within existing right-of-way. Measures of effectiveness based on the project purpose, goals, and objectives were established as part of this evaluation, and an engineering fatal flaws analysis was conducted for these 16 Build Alternatives. Specific measures of effectiveness and evaluation criteria for the Screen 1 Evaluation were based on the purpose and need and allowed for a comparison of alternatives with regard to transit network performance, rider experience, urban design and economic vitality, road design and traffic capacity, and relative costs of construction.

Based on this Screen 1 Evaluation, six BRT Build Alternative configurations were recommended for further evaluation in the Screen 2 Analysis. Full details on the Screen 1 analysis and findings may be found in **Appendix A-2**. These six potential Build Alternatives were presented to the public in June 2012 and to stakeholders in a design charette held in July 2012. Based on input from the public and stakeholders during this design charette, the six Build Alternatives were further narrowed down to four Build Alternatives for the Screen 2 Evaluation. The two alternatives dropped from further consideration involved narrowing sidewalks; comments from the public indicated that there was a desire to retain existing sidewalk width.

The four alternatives carried forward for Screen 2 Evaluation included design variations with two options for operating BRT on center running lanes and two options for operating BRT along curbside lanes:

- Center Running BRT – *Travel Lane Removal*
- Center Running BRT – *Parking and Median Removal*
- Curbside Running BRT – *Travel Lane Removal*
- Curbside Running BRT – *Parking and Median Removal*

The No-Build and TSM Alternatives were also retained for further analysis and comparison in the Screen 2 Evaluation. The four potential Build Alternatives advancing to the Screen 2 Evaluation were defined more thoroughly to include station locations, station design considerations, and necessary infrastructure and operational improvements such as queue jumps/bypass lanes and TSP improvements. Conceptual station locations for Ashland Avenue were identified by analyzing corridor demographics and land use, local bus stop and operational data, proximity to other regional public transportation transfer locations, and with a focus on best practices for BRT station locations to be located at least a half mile apart. The four Build Alternatives identified above and the TSM Alternative in the Screen 2 Evaluation provided an understanding of the unique components and requirements for each potential Alternative compared to the No-Build Alternative. A detailed technical memorandum describing the Screen 2 Evaluation is contained in **Appendix A-3**.

The eight evaluation factors for the Screen 2 Evaluation included a mix of qualitative and quantitative measures intended to evaluate the performance of each alternative with respect to the project goals and objectives. Specific evaluation factors included: demographics, economic development, ridership, transit operations, complete streets, traffic and parking, and relative operational and capital costs. Evaluation also included consideration of environmental resources, including:

- Wetlands
- Historic districts and buildings
- Archaeological resources
- Parkland and recreational areas
- Open space
- Visual impacts
- Hazardous materials
- Air quality
- Noise and vibration
- Environmental justice

For this environmental evaluation, wetlands, historic resources, parklands and recreational areas, as well as open space resources within 500 feet of each corridor were identified and then the potential for impacts to these resources was assessed. For the other environmental resources considered, a qualitative review of the potential for impacts was conducted.

Each alternative's performance was compared and assigned an evaluation rating for each evaluation factor, which allowed for a technical recommendation on a Preferred Alternative. Technical results of this Screen 2 Evaluation were subsequently presented to the public in October 2012 to further assess public support for the alternatives, and were subsequently refined through additional analysis of conceptual engineering criteria.

Based upon the cumulative results of the Screen 2 Evaluation and the evaluation of public support from comments received at public open houses, stakeholder outreach and input, and community meetings, the Center Running BRT, Travel Lane Removal Alternative received the highest ranking for both the Western and Ashland Avenue BRT corridors, and was identified as the Preferred Alternative design to move through subsequent environmental and conceptual engineering analysis. These detailed results are provided in **Appendix A-3**.

While both the Ashland and Western corridors using center running BRT with travel lane removal rated similarly in the evaluation as the Preferred Alternative, Ashland was prioritized to move forward through the project development process first. CTA chose to prioritize the Ashland Avenue corridor because it contains the highest ridership route in the CTA bus system, has the slower existing bus speeds of the two corridors, and contains a higher concentration of connections to the existing transit system and major activity generators. As such, this corridor was determined to better meet the purpose and need defined through the AA process.

Based on the evaluation of the TSM and BRT Build Alternatives in the AA, it was determined appropriate to remove the TSM Alternative from further consideration in subsequent phases of environmental and design development. Based on the findings of the AA, the TSM Alternative was determined to result in conditions similar to No-Build conditions and therefore would not meet the purpose and need for this project. While reinstituting express bus service along Ashland Avenue would require less initial capital costs, it would result in minimal improvements to bus travel speeds and transit reliability in the corridor compared with BRT Alternatives. It also would not adequately address regional growth pressures and enhanced demands to provide options that could offer viable mode shift potential and an alternative to congestion in the corridor. In addition, the TSM Alternative was determined to result in conditions similar to No-Build conditions in terms of land use and economic development benefits.

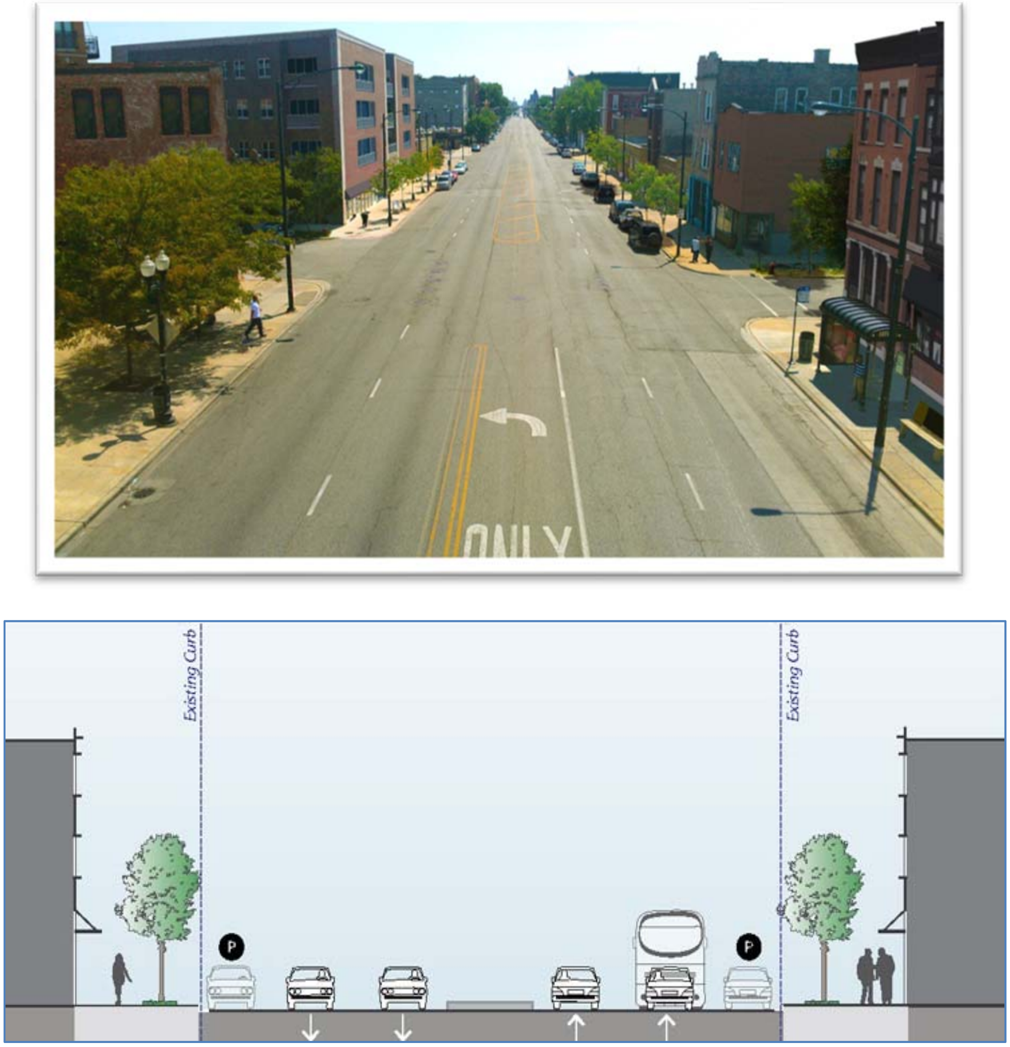
While the TSM Alternative was removed from further consideration as described above, the No-Build Alternative has been retained for the purposes of the environmental evaluation contained in this EA. The No-Build Alternative provides a baseline against which to evaluate the effects of the Build Alternative on social, economic, transportation, and environmental factors.

2.2 No-Build Alternative

The No-Build Alternative would retain the existing street configuration, which typically consists of two travel lanes in each direction, painted or small medians, and on-street parking. Within the Illinois Medical District (IMD), the existing street configuration is different, with narrower sidewalks, three lanes of travel in each direction, and no on-street parking. The No-Build Alternative assumes no major transit system improvements or investments within the Ashland Avenue corridor. Pictures of existing conditions along the corridor and a typical roadway section are provided in **Figure 2-1**.

The No-Build Alternative would maintain existing transit service currently in operation and include only routine maintenance of existing transit and roadway systems. CTA Bus Route □9 currently provides primary north-south service along the Ashland Avenue corridor as indicated in **Table 2-1**. Primary operations on Route □9 are from Irving Park Road to 95th Street.

Figure 2-1: No-Build Alternative



Under the No-Build Alternative, transit service along the corridor would continue to operate every five to 10 minutes during weekdays and every 10 to 12 minutes on weekends. Buses would continue to operate in mixed traffic, stopping at the 148 northbound and 148 southbound bus stops along the Ashland Avenue corridor without additional TSP. No improvements to bus stops, stations, or pedestrian space and amenities would be provided. Bus travel speeds along the majority of the corridor, which currently average 8.7 miles per hour in peak periods, would be subject to the same delay patterns found today. Given these factors and the inadequacy of the No-Build Alternative to address persistent growth and mobility needs outside of downtown, the No-Build Alternative was determined not to meet the purpose and need for the project and therefore was not identified as the Preferred Alternative.

Table 2-1: No-Build Alternative Transit Operational Service Characteristics

Route	Hours	Headways
#9/N9	Weekday	5-10 Minutes
	Weekend	10-12 Minutes
	Midnight - 3 a.m.	30 Minutes

2.3 Build Alternative

The Build Alternative, shown on **Figure 2-2**, is the Preferred Alternative and consists of a 16.1-mile long BRT corridor along Ashland Avenue from Irving Park Road in the north to 95th Street in the south. Construction of the Build Alternative would occur within right-of-way and augment existing local bus service already in place along the corridor. The Build Alternative would include one center running bus-only lane in each direction, one automobile travel lane in each direction, on-street parking on both sides of the road, and a median. In order to accommodate the BRT design, one general travel lane in each direction would be removed and a small reduction to on-street parking would occur primarily at new station locations to accommodate stations and dedicated right-turn lanes. Existing parking and loading zones would be retained on each side of the street along the rest of the corridor.

Left turn lanes at intersections and left turn pockets would also be removed in most locations to accommodate the dedicated bus-only lanes. Left turns would be retained at existing interstate highway crossing locations to continue to accommodate industrial corridors in the area with regional east-west access. Existing medians would be retained and new landscaped medians would also be provided where there are none existing. Sidewalk widths would be retained and curb extensions would be provided at station intersections to enhance pedestrian access and space at the BRT stations.

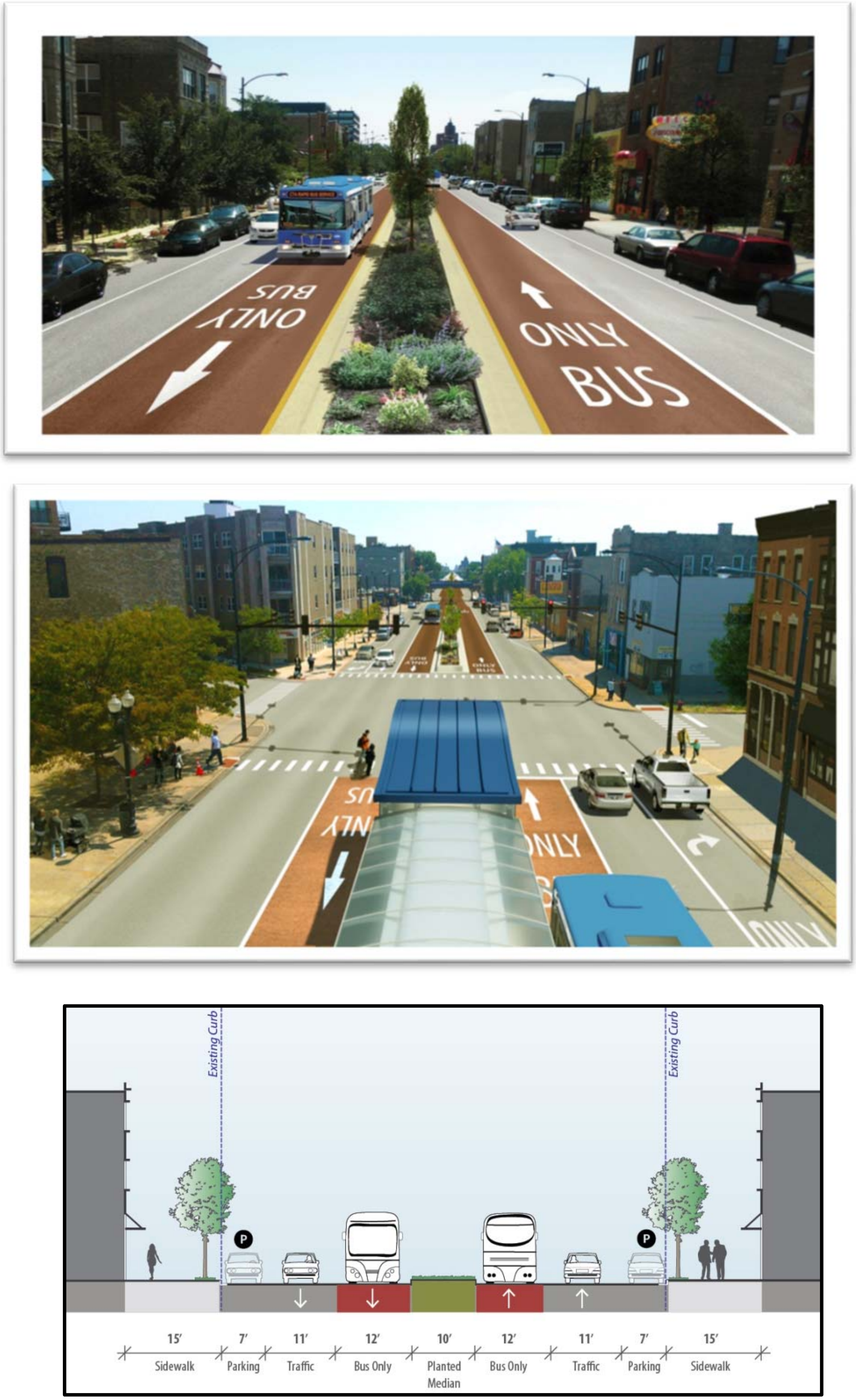
Center platform, branded stations are proposed at 35 distinct intersection locations along the corridor, one approximately every half mile and at CTA rail stations. TSP improvements would be implemented at all signalized intersections along the corridor for bus priority to increase bus speeds along the corridor. A typical station would include a platform with shelters, passenger seating, closed circuit television prompters, displays with real-time bus arrival information, lighting, security cameras, and trash receptacles. It is assumed that for station layout purposes ticket vending, fare validation machines (with the potential for pre-paid boarding), smart card readers, and security call-back systems would also be included at the stations. Note that specific ticketing procedures and station amenities would be selected during final design. Americans with Disabilities Act of 1990 (ADA)-compliant ramps would also be provided at stations along with level boarding onto BRT vehicles.

Headways for the proposed BRT service would be between five and 15 minutes and would meet the FTA definition of BRT. Local bus service would continue to operate along the corridor, with BRT service added to increase mobility and enhance transit options.

To allow for flexible implementation and provide options for various funding opportunities, the capital improvements for the project are proposed to be built in two phases. The first phase of this BRT project would be implemented along 5.4 miles of the corridor, from Cortland Street to 31st Street. Outside of the Phase 1 limits, the BRT service would stop at the BRT station locations using existing curbside bus stops for the remainder of the 16.1-mile corridor until the next phase is built. Conceptual plans for the Build Alternative, indicating the layout for Phase 1 limits and the next phase are included in **Appendix G**.

Corridor design in the next phase (Phase 2) would be similar to that in Phase 1 and include center running, dedicated BRT lanes and center median stations. Below are details on the proposed project phasing plan.

Figure 2-2: Build Alternative (Preferred Alternative)



Estimated Project Implementation Schedule

To allow for flexible implementation and provide options for various funding opportunities, the Ashland Avenue BRT Project is proposed to be implemented in phases, as shown on **Figure 2-3**. Phase 1, from Cortland Street to 31st Street, was identified to move forward first based on the following:

- Provides multiple transit network connections, including access to five CTA 'L' stations, one Metra commuter rail station, and 16 bus routes
- Serves the IMD, a major regional employment hub providing over 20,000 jobs
- Serves other key activity generators, including industrial corridors, Malcolm X College and the United Center
- The existing bus service currently operates at some of the lowest bus speeds in the city
- Contains some of the highest ridership within the Ashland Avenue corridor

Phase 2, from 31st Street to 95th Street in the south and from Cortland Street to Irving Park Road in the north (a total of 10.7 miles) would be implemented next, and would complete the 16.1-mile center running BRT service. **Tables 2-2** and **2-3** provide an estimated project implementation schedule and key milestone dates identified and anticipated as this project moves forward (contingent upon funding availability):

Table 2-2: Phase 1 Implementation Schedule
(Cortland Street to 31st Street)

Timeframe	Milestone
February 2012	Project Initiation
February 2013 – February 2014	NEPA*/Concept Design
March 2014 - August 2015	Final Design
February 2016 - December 2016	Construction of Phase 1
January 2017	Begin Revenue Service in dedicated lanes within Phase 1 limits and as express service outside of these limits

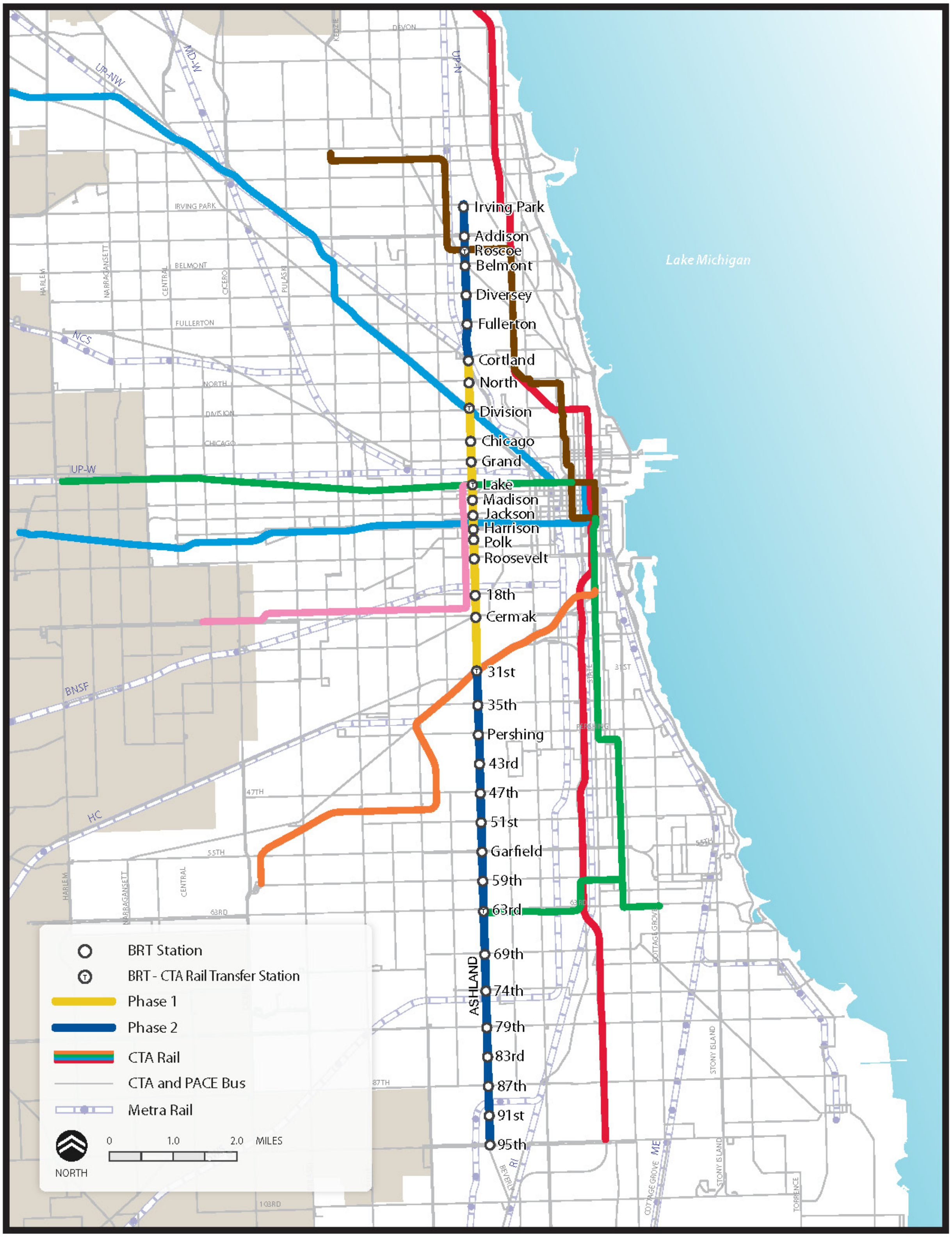
*National Environmental Policy Act of 1969

Table 2-3: Phase 2 Implementation Schedule
(31st Street to 95th Street and Cortland Street to Irving Park Road)

Timeframe	Milestone
October 2016 - October 2017	Final Design
February 2018 - December 2018	Construction of Phase 2
January 2019	Operations Begin with BRT service in dedicated lanes along the entire 16.1-mile corridor.

Future construction phase schedules are planned based on reasonable expectations and commensurate with funding availability. It should be noted that these dates are based on anticipated project activities, and are subject to modification based upon FTA review schedules, state and federal requirements and approvals for the project, and other factors that could occur through final design and construction of this project.

Figure 2-3: Ashland Avenue BRT Project Phasing Limits



Project Costs and Funding

Construction costs were developed during the AA screening process and represent preliminary project costs of the Build Alternative. These estimates would be further refined through conceptual engineering. Anticipated capital costs for roadway improvements are on the order of approximately □161 million for the entire 16.1-mile corridor.

Improvements for the 5.4-mile Phase 1 plan from Cortland Street to 31st Street are estimated at □61 million for roadway construction. Vehicle costs are estimated at □50 million. Design costs are estimated at approximately 10 percent of roadway construction costs. Funding for these capital improvements would be sought for this project under FTA□s Small Starts Program and supplemented by various local resources.

Through each phase of implementation, detailed operating costs would be developed. Compared to local bus operational costs, CTA estimates that BRT service along Ashland Avenue would be 36 percent more cost efficient. Details on comparative costs may be found in the Screen 2 Technical Memorandum in **Appendix A-3**.

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3. TRANSPORTATION CONDITIONS AND ANALYSIS

This chapter provides detailed data on the potential transportation impacts of the 16.1-mile Build Alternative on the local and regional transportation system, including road traffic patterns, traffic volumes, parking, and transit facilities and services. Descriptions of existing conditions are included in each section for the purpose of examining the No-Build Alternative. Assumptions for determining impacts from the Build Alternative are provided for each area of the transportation analysis. The detailed supporting technical memoranda for each section are included in **Appendix B** through **Appendix D**, and are referenced as appropriate.

This chapter will walk the reader through several steps to show:

- **Traffic Analysis –** The first section will discuss the impacts to vehicles travelling in the corridor. This is measured utilizing both regional and local traffic models based on traffic counts from 2013.

- **Parking Impact Analysis –** This section will identify the overall impacts to parking and loading zones in the corridor.

- **Transit Operational Analysis –** The last section will discuss the impacts to transit operations in the corridor as a result of implementing the improved Bus Rapid Transit (BRT) service.

3.1 Traffic Analysis

The Ashland Avenue BRT Project would cause changes in roadway traffic volumes, local access, and circulation patterns. This section further defines:

- Traffic related improvements proposed as part of this project,
- The methodology employed to assess potential traffic impacts, and
- Results of this analysis, and proposed recommendations.

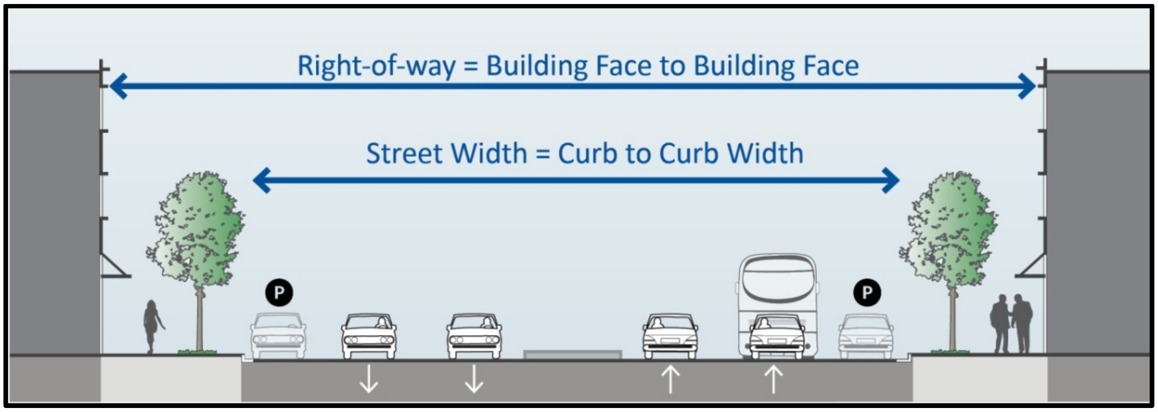
Mitigation efforts to offset potential impacts are described in **Section 3.2**.

The Chicago Transit Authority (CTA) and the Chicago Department of Transportation (CDOT) have coordinated with the Federal Transit Administration (FTA), the Illinois Department of Transportation (IDOT), and Cook County Department of Transportation and Highways (CCDOTH) throughout the planning process on the traffic analysis. Additional traffic analysis is also part of this ongoing agency coordination process. As more traffic refinements are made through conceptual engineering and into final design and construction, CTA and CDOT would continue to work with agency partners and the public on more detailed design solutions to specific local traffic diversion along the corridor, including the provision of left turns at certain locations to provide additional residential and business access.

3.1.1 Defining the Proposed Action

The Build Alternative proposes to implement BRT within the existing right-of-way and with minimal changes to the location of sidewalk curbs. Right-of-way is generally defined as the width between building faces and is useful for defining multimodal uses of the corridor such as sidewalk space for pedestrian use. Curb-to-curb widths refer to the area between the curbs that is utilized for moving vehicles (cars, trucks, buses, and bicycles) as well as for accommodating parking and loading zones. Right-of-way and curb-to-curb extents are shown on **Figure 3-1**.

Figure 3-1: Right-of-Way and Street Width Extents


Right-of-way = Building Face to Building Face
Street Width = Curb to Curb Width
P
P

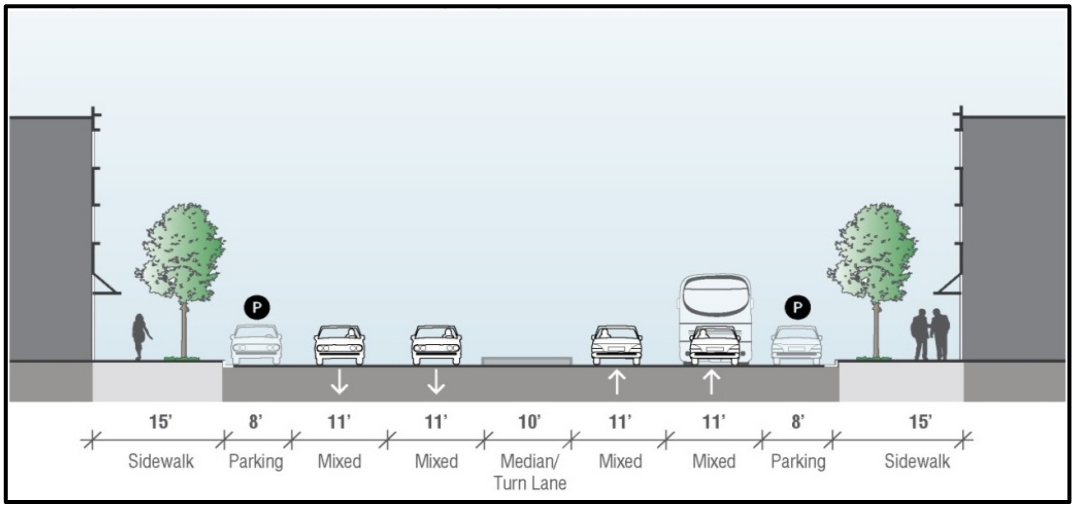
One of the reasons BRT is a viable option for the Ashland Avenue corridor is that the existing right-of-way and curb-to□curb widths can support an integrated, multimodal and connected network within the existing corridor. As shown in **Table 3-1**, existing right-of-way along the corridor varies between 100 and 110 feet, with curb-to-curb widths of 70 to 80 feet. Within the right-of-way, the space is dedicated to multiple transportation uses, as shown in **Figure 3-2**. These include:

- Sidewalks: Sidewalks exist along the length of Ashland Avenue. In some locations, planted grass strips between the sidewalk and curb provide a buffer between pedestrians and vehicular traffic.
- General Purpose Travel Lanes: Two northbound and two southbound travel lanes utilized by buses, automobiles, trucks, and bicycles.
    - Between Madison Street and Roosevelt Road, near the Illinois Medical District (IMD), curb-to-curb widths are wider (80 feet) and three existing lanes of traffic in each direction are provided without on-street parking.
- Intersections: Intersections are generally separated by raised or striped medians with right and left turning lanes at intersections.
- Medians: Northbound and southbound travel lanes are generally separated by raised or striped medians.
- Parking Lanes: Parking (metered and unmetered) is generally provided on both sides of the street.

Table 3-1: Existing Ashland Avenue Right-of-Way and Curb-to-Curb Widths

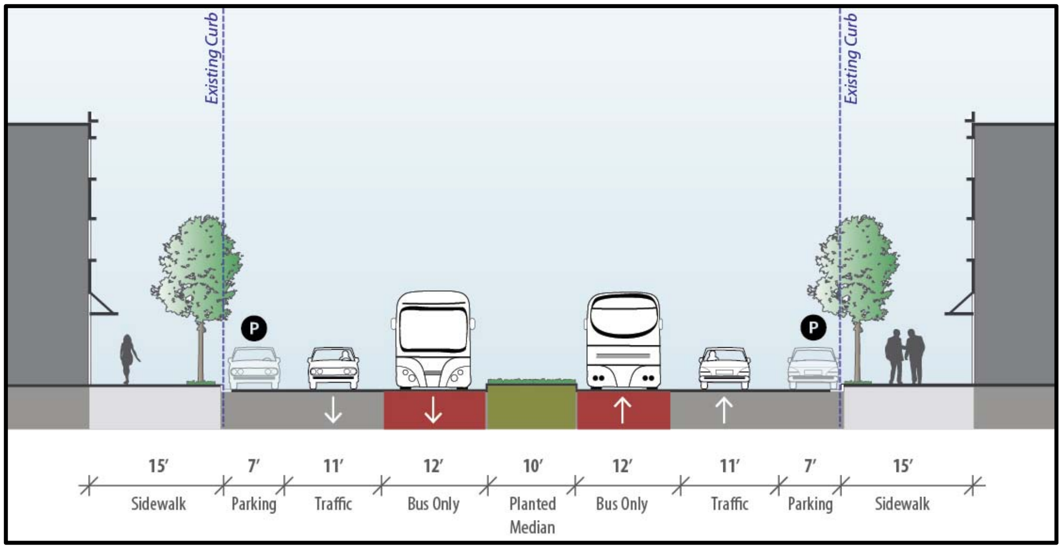
Start Point	End Point	Distance (Mile)	Curb-to-Curb Width (Feet)	Right-of-Way Width (Feet)	# of Lanes	
					South-bound	North-bound
Irving Park Rd.	Lake St.	4.83	70	100	2	2
Lake St.	Madison St.	0.27	80	100	2	2
Madison St.	Roosevelt Rd.	1.01	80	100	3	3
Roosevelt Rd.	15th St.	0.37	80	100	2	2
15th St.	Cermak Rd.	0.63	70	100	2	2
Cermak Rd.	Archer Ave.	1.01	75	110	2	2
Archer Ave.	95th St.	8.05	70	100	2	2

Figure 3-2: Typical Existing Ashland Avenue Roadway Configuration



The proposed Build Alternative, shown in **Figure 3-3**, would be implemented within the existing right-of-way.

Figure 3-3: Typical Proposed Ashland Avenue Roadway Configuration



Within the right-of-way, the proposed Build Alternative includes:

- Sidewalks: Sidewalks would still exist along the length of Ashland Avenue. Additional pedestrian space, in the form of curb extensions, would be provided at signalized intersections.

  New curb ramps with truncated domes (a standard surface texture used to provide the visually impaired with detectable information about the boundary between the sidewalk and street), countdown pedestrian heads and audible pedestrian crossing devices to meet ADA accessibility requirements would be provided at all proposed station locations.

  These improvements, combined with installation of enhanced pedestrian amenities at each half mile station are proposed to improve pedestrian access and pedestrian travel throughout the corridor.

- BRT Lanes: One center running bus-only lane in each direction. One existing general purpose travel lane would be removed in each direction to accommodate the BRT lanes.

- General Purpose Travel Lanes: One general purpose travel lane would be maintained in each direction; two general purpose lanes would be maintained in each direction between Madison Street and Roosevelt Road.

  Left turn lanes and left turn pockets at intersections along the corridor are proposed to be removed and replaced by raised medians. As a result, left-turn movements from Ashland Avenue would be prohibited except at the following interstate highway access points in order to maintain regional traffic patterns:

  - Kennedy Expressway (I-90) via Armitage Avenue,
  - Eisenhower Expressway (I-290) via Van Buren Street and Congress Parkway, and
  - Stevenson Expressway (I-55) via 31st Street and Robinson Street.

  At un-signalized intersections and alley ways, only right-turn movements onto and from Ashland Avenue would be allowed due to the presence of raised medians. Because a number of raised medians are already located along the corridor, existing access to properties and driveways along the corridor from opposite sides of the road are already restricted and are not anticipated to change greatly as a result of the proposed project.

- Transit Signal Priority (TSP): Upgrades would be installed at all signalized intersections along the corridor to manage traffic movements and provide efficient and reliable BRT movements.

- Medians: Northbound and southbound travel lanes would be separated by raised medians. The raised medians would extend the length of Ashland Avenue except at signalized intersections, key one-way streets, and at critical commercial drives that would be signalized.

- Parking: Parking would be predominantly retained on both sides of the street (see additional details on parking impacts in **Section 3.3**)

3.1.2 Traffic Impact Methodology

For the purposes of understanding the traffic impacts of the Build Alternative, a detailed methodology has been developed to analyze impacts to roadway volumes, distribution and local circulation patterns. This process takes into account impacts from both a regional and localized perspective. It assumes full traffic implications of the Build Alternative including removal of one travel lane in each direction and left turns along the corridor (except at interstate access points). This methodology for the analysis provides a way to evaluate the greatest potential traffic impacts that could result from the Build Alternative. As more traffic refinements are made, CTA and CDOT would continue to work with agency partners and the public on more detailed design solutions to specific local traffic diversion along the corridor, including the provision of left turns at certain locations to provide sufficient residential and business access.

1. Regional Impacts Analysis: A regional traffic analysis of the Build Alternative was undertaken as a first step in this process. It quantifies changes in regional travel patterns resulting from removing a traffic lane in each direction and removal of left turns.

   Regional travel models are the standard analytical tool used for the analysis of travel patterns in urban areas. Chicago Metropolitan Agency for Planning (CMAP), the Chicago region's metropolitan planning organization (MPO), has developed and maintains a travel demand model for transportation planning within the Chicago metropolitan area, which was utilized for this regional analysis. The results of this analysis provide insight into the impact of the Build Alternative on the city-wide transportation network, including traffic impacts and benefits to transit ridership.

   In addition, the CMAP travel demand model was used to complete a more focused analysis of traffic diversion to roadways parallel and adjacent to the Ashland Avenue corridor.

2. Local Impacts Analysis: While regional travel demand analysis provides a basis for understanding the overall regional impacts and larger project area traffic impacts from traffic diverting to different roadways, these models are not designed to analyze specific, isolated corridor impacts such as intersection level capacity analysis. Data inputs from this regional model, however, do provide useful information for this more detailed analysis.

   A traffic analysis of intersection operating conditions along the corridor was also conducted using No-Build Alternative traffic data and modeled traffic volumes representing the Build Alternative design and operational conditions. This analysis identifies volume and capacity changes along the corridor itself as a result of the Build Alternative and provides a more detailed basis for special design considerations within the corridor and recommendations for local on- and off-corridor improvements.

The following sub-sections provide more detailed information on these methods and results. Details on mitigation are provided in **Section 3.2** to address the resulting impact analysis findings.

3.1.3 Regional Traffic Diversion Impacts Analysis

City-Wide Diversion Evaluation

With the removal of a travel lane in each direction, some vehicles currently using Ashland Avenue would divert or re-route to use other parallel roadways for their trips. For the regional transportation diversion analysis, the regional CMAP travel demand model was utilized. The CMAP travel demand model contains representation of the highway system (freeways, major arterials, and collectors) as well as the transit system (Metra commuter rail, CTA bus and rail service, and PACE bus service).

Two key metrics analyzed by the CMAP model are Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT). These are measures of the amount of driving that is taking place, cumulatively, in a given area or along a given corridor. VMT measures the number of miles driven; VHT measures the total time spent driving. The CMAP travel demand model also analyzed mode shifts — that is, a measure of the shift of trips from using one mode of transportation (e.g. personal vehicles) to another mode (e.g. transit) — anticipated from the Build Alternative. Further details on the CMAP model, input factors and further details on this regional diversion analysis can be found in **Appendix B-1** (*Regional Traffic Diversion Analysis Technical Memorandum*).

VMT — The number of miles driven.

VHT — The total time spent driving.

Mode Shift — Shift of trips from using one mode of transportation (e.g. personal vehicles) to another mode (e.g. transit) along a corridor.

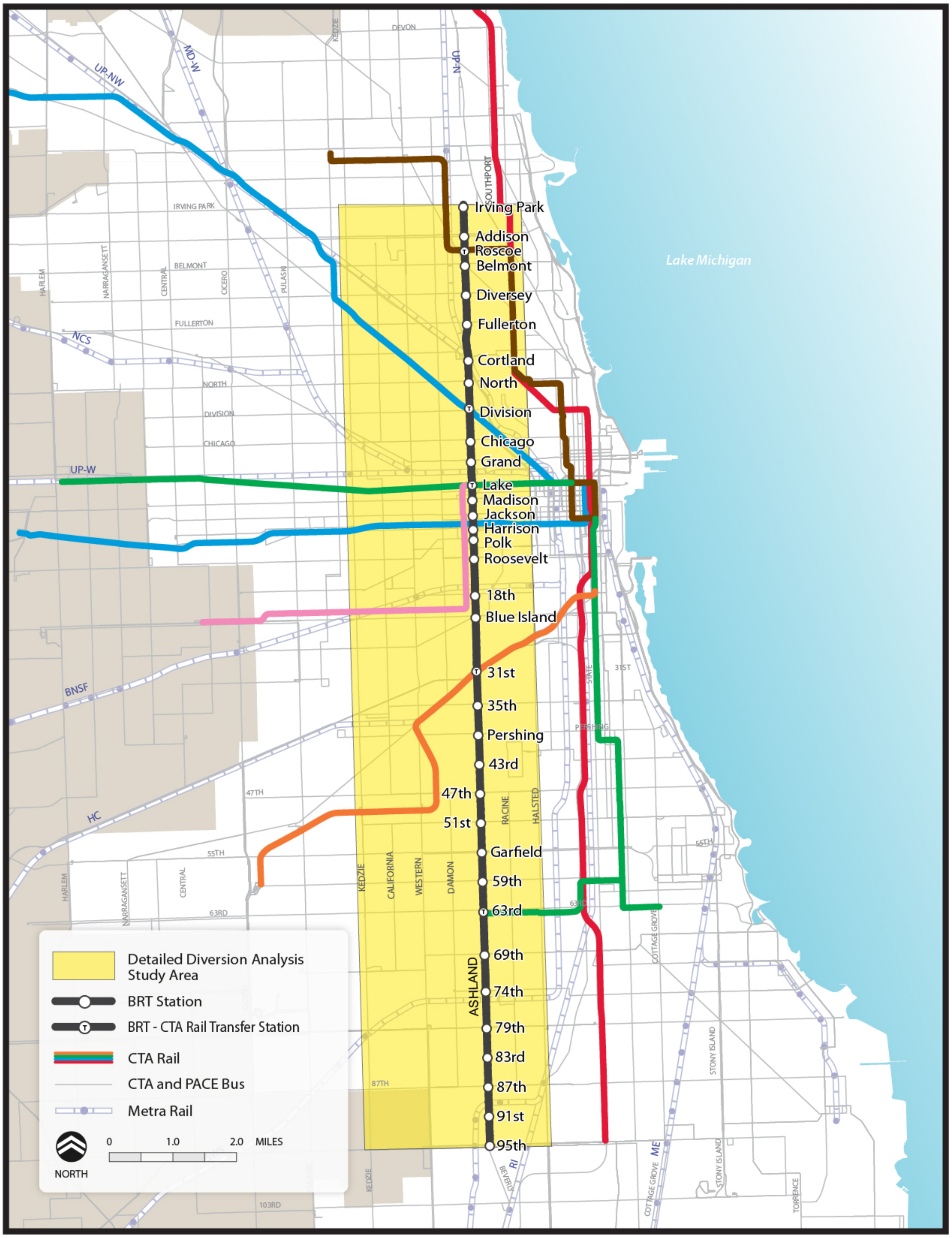
Initial CMAP modeling of the Build Alternative indicates that the proposed Ashland Avenue BRT service would result in very minor changes to daily city-wide traffic conditions. Compared to the existing conditions, people across the City of Chicago would be driving slightly shorter distances (VMT projected to decrease 0.08 percent), and for a slightly shorter amount of time (VHT projected to decrease 0.01 percent). The projected decreases in VMT and VHT indicate that the project would slightly decrease traffic volumes and/or shorten trips that would be diverted off of Ashland Avenue.

Study Area Diversion Evaluation

Given these minor city-wide changes, a smaller study area, surrounding the proposed Ashland Avenue BRT corridor was selected for more detailed traffic and transit analysis. The roadway network study area identified for more detailed diversion analysis was bounded by Irving Park Road, to the north, and 95th Street, to the south. It included the major north-south roadways one mile to the east and two miles to the west of Ashland Avenue: (1) Kedzie Avenue, (2) California Avenue, (3) Western Avenue, (4) Damen Avenue, (5) Ashland Avenue, (6) Racine/Southport Avenue and (7) Halsted Street. See **Figure 3-4** for the limits of the diversion analysis study area.

These parallel roadways represent the most likely alternative roadways for diversion of traffic due to implementation of the Build Alternative. They were selected based on the CMAP travel demand model results and standard traffic engineering assumptions about travel behavior utilizing shortest paths between origins and destinations.

Figure 3-4: Diversion Analysis Study Area



In addition, the transit network including all existing north-south CTA bus routes operating on north-south roadways within the study area were defined as inputs for the transit impacts side of the analysis.

Using the CMAP travel demand model and these inputs, an initial analysis was performed to determine impacts of implementing the Build Alternative on the roadways within the study area defined above. The analysis determined the congestion impacts on alternate routes as a result of the removal of two travel lanes on Ashland Avenue (reduction in roadway capacity). It also identified potential impacts outside of the corridor on other roadways due to re-routing of traffic off of Ashland Avenue. Details on the analysis procedure are provided in **Appendix B-1**. The following metrics were compared between existing conditions and the Build Alternative to determine the projected percent shift in traffic from Ashland Avenue to parallel arterials:

- VMT - summation of all VMT on roadway facility segments
- Congested VMT - summation of all VMT on roadway facility segments where the volume on the roadway exceeds the capacity of the roadway (v□c □1)
- Percent Congested VMT - congested VMT compared to total VMT
- VHT - summation of all VHT on roadway facility segments
- Congested VHT - summation of all VHT on roadway facility segments where the volume on the roadway exceeds the capacity of the roadway (v□c □1)
- Percent Congested VHT - congested VHT compared to total VHT
- Travel Speed - average congested travel speed (miles per hour [mph]) on roadway facility segments (both directions)

VMT □ The number of miles driven.

VHT □ The total time spent driving.

Volume/Capacity (v/c) □ Volume on the roadway compared to the capacity of the roadway.

The existing conditions assumptions were based on the regional modeling inputs used for the 2010 analysis year in the air quality conformity analysis completed by CMAP in spring 2012. The roadway network represented the existing segment geometrics and capacity, left- and right-turn restrictions, and traffic signal timings. The transit network represented the existing bus route stop locations, frequency (number of buses per hour), service span (hours of operation), and bus speeds. The Build Alternative assumptions were based on the following design and operating assumptions and utilized maximum operational characteristics since full transit operational plans were not available at the time of the analysis:

- **Left-Turn Restrictions** □ left-turns were restricted at all the intersections along Ashland Avenue between Irving Park Road to the north, and 95th Street to the south to determine the effects of maximum implementation of the BRT from a regional traffic standpoint.

- **Travel Lane Removal** □ one travel lane in each direction was removed along Ashland Avenue between Irving Park Road, to the north, and 95th Street, to the south.

- **BRT Service Characteristics** □ BRT service characteristics assumed a 24 hour service span, 5 minute headways, 15.9 miles per hour average running speed, and proposed stop locations at the 35 proposed intersections along the corridor. Local bus service is assumed to remain in place.

These assumptions provide the most rigorous implementation of project design and operational features of BRT in order to ascertain traffic diversion impacts. More detailed results of travel volumes for existing (No-Build) and the Build Alternative by route and in aggregating north-south and east-west movements are provided in **Appendix B-1**. A comparison of the change in traffic volumes resulting from the Build Alternative is also provided in **Appendix B-1**. **Tables 3-2** and **3-3** summarize the results of that analysis.

Compared to existing conditions, the Build Alternative conditions decreased the total miles driven on Ashland Avenue (VMT projected to decrease by 35 percent) and increased the number of those miles driven during congested conditions (congested VMT projected to increase by seven percent). Similarly, the total hours driven decreased (VHT projected to decrease by 34 percent) and the total time drivers spend in congested conditions increased (congested VHT projected to increase by seven percent), resulting in a net ten percent decrease in average daily travel speed along Ashland Avenue.

Compared to existing conditions, the Build Alternative conditions decreased VMT by one percent and increased congested VMT by five percent within the study area. VHT would not change as a result of the Build Alternative and congested VHT would increase by six percent.

The Build Alternative would result in a traffic shift from Ashland Avenue to other roadways in the surrounding roadway network. However, the results of the analysis indicate that the robust Chicago grid network is sufficient to absorb the traffic shifts across multiple parallel roadways, resulting in minor VMT increases (two percent to 12 percent) along any one facility within the study area. The grid network provides many different traffic routing options for drivers between origins and destinations within the city.

Table 3-2: Percent Change between Existing Conditions and Build Conditions by Routes

	Kedzie Ave.	California Ave.	Western Ave.	Damen Ave.	Ashland Ave.	Racine Ave./ Southport Ave. (and adjacent routes)	Halsted St.
VMT	3□	2□	6□	2□	-35□	12□	4□
Congested VMT	4□	8□	29□	4□	7□	25□	4□
VHT	3□	2□	7□	5□	-34□	12□	5□
Congested VHT	5□	6□	30□	8□	7□	24□	6□
Travel Speed	-1□	-1□	-2□	-3□	-10□	-3□	-1□

Source: CMAP, May 2013.

Table 3-3: Percent Change between Existing Conditions and Build Conditions by Corridors

	North–South Corridor	East–West Corridor	North-South & East-West Corridors
VMT	-2□	0□	-1□
Congested VMT	10□	0□	5□
VHT	-1□	0□	0□
Congested VHT	11□	1□	6□

Source: CMAP, May 2013.

Appendix B-1 also includes maps showing the breakdown of traffic diverted from Ashland Avenue to parallel roadways for AM and PM peak hours within the Phase 1 limits.

3.1.4 Local Impacts Analysis: Corridor Intersection Level Capacity Analysis

In order to evaluate the local impacts, a traffic analysis of intersection operating conditions was conducted. The purpose of this analysis was to identify specific locations that present critical impediments to traffic flow and to provide design considerations for the Build Alternative at these locations. This analysis was conducted for (1) Existing Conditions and (2) Build Alternative conditions.

Traffic volumes, roadway design (i.e., lane widths, number of lanes), and traffic signal timing plans were some of the inputs used to analyze Level of Service (LOS) at all signalized intersections along Ashland Avenue. In addition, a field review was conducted to evaluate intersection operations and traffic flows during AM and PM peak (rush hour) travel periods. Detailed information on the traffic analysis methodology, inputs, and outputs are provided in **Appendix B-2**.

The methodology used for the development of this intersection capacity analysis included:

1) 2013 traffic count data supplemented by adjusted historic traffic data from CDOT for 89 signalized intersections

2) Existing AM and PM peak hour traffic conditions were analyzed using SYNCHRO modeling software

3) Traffic volume forecasts for the Build Alternative conditions were developed based on the CMAP regional travel demand model for existing conditions and assuming design considerations of the Build Alternative

4) Build Alternative AM and PM peak hour traffic conditions were analyzed using SYNCHRO modeling software

5) Intersection operating deficiencies resulting from implementation of the project were identified and special design considerations at these locations are provided

The SYNCHRO traffic analysis determined the LOS for the intersections along the corridor. LOS provides a representative letter scale from LOS A to LOS F, with LOS A representing uncongested or free flow conditions and LOS F representing significantly congested conditions, as shown in **Table 3-4**.

Table 3-4: Categorization of Level of Service

Signalized Intersection Level of Service

LOS A □	Free flow (intersection control delay: □10 sec□veh)
LOS B □	Reasonably free flow (intersection control delay: 10-20 sec□veh)
LOS C □	Stable flow (intersection control delay: 20-35 sec□veh)
LOS D □	Approaching unstable flow (intersection control delay: 35-55 sec□veh)
LOS E □	Unstable flow (intersection control delay: 55-80 sec□veh)
LOS F □	Forced or breakdown flow (intersection control delay: □80 sec□veh)

Source: Transportation Research Board, Highway Capacity Manual 2010, National Research Council, 2010.

As shown in the summary intersection LOS table in **Appendix B-2** and graphically on **Figures 3-5** to **3-8,** the majority of the intersections along Ashland Avenue are currently operating at an acceptable LOS (LOS D or better) in both AM and PM peak hours. However, six intersections of the 89 are currently operating at LOS E or worse in either or both the AM or PM peak hours or in both AM and PM peak hours. These six intersections with existing deficiencies would continue to operate at unacceptable LOS with the Build Alternative and intersection delay (average total delay of vehicles at all intersection approaches) is expected to increase at these locations, as shown in **Table 3-5**. CDOT considers LOS A through D acceptable. CDOT considers LOS E and F unacceptable.

Table 3-5: Ashland Avenue Existing Deficient Intersection LOS and Intersection Delay (in seconds)

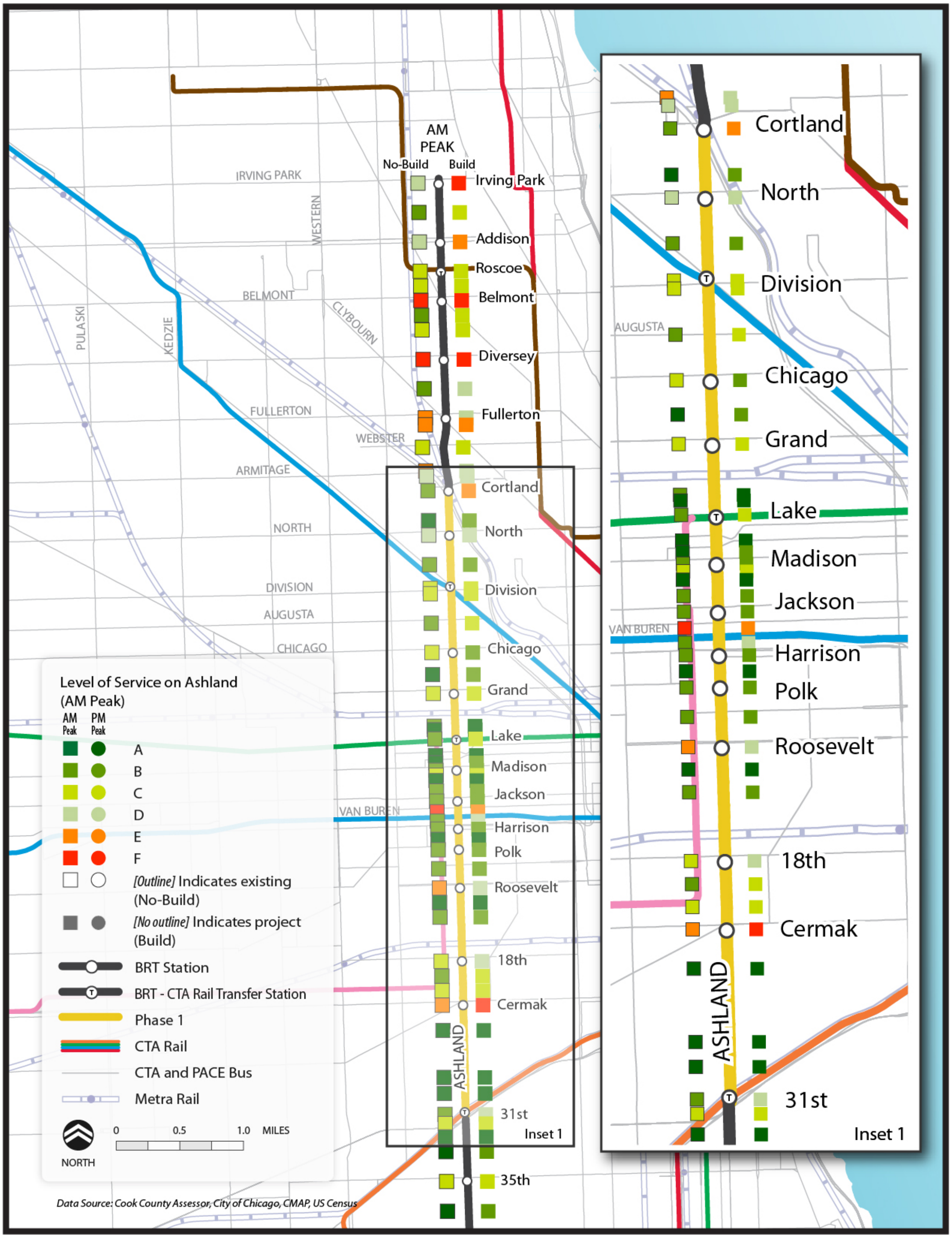
Intersection	Existing		Build		Change	
	AM	PM	AM	PM	AM	PM
Belmont Avenue/Lincoln Avenue	F□128.2	F□84.8	F□162.7	F□127.3	□34.5	□42.5
Diversey Parkway	F□131.7	F□115.6	F□225.1	F□225.6	□93.4	□110.0
Clybourn Avenue	E□74.9	E□73.5	E□60.7	D□48.7	-14.2	-24.8
Van Buren Street	F□94.4	B□18.7	E□59.7	C□32.8	-34.7	□14.1
Roosevelt Road	E□59.7	D□50.3	D□46.6	E□61.5	-13.1	□11.2
Cermak Road/Blue Island Avenue	E□68.1	D□51.5	F□145.6	F□115.4	□77.5	□63.9

Seven intersections of the 89 are currently operating at LOS D or better in both the AM and PM peak hours under existing conditions but would operate at unacceptable LOS either in the AM, PM, or both AM and PM peak hours under the Build Alternative. Intersection delay is expected to change, as shown in **Table 3-6**. Mitigation options for these intersections are discussed in the section that follows.

Table 3-6: Ashland Avenue Unacceptable LOS and Delay (in seconds)

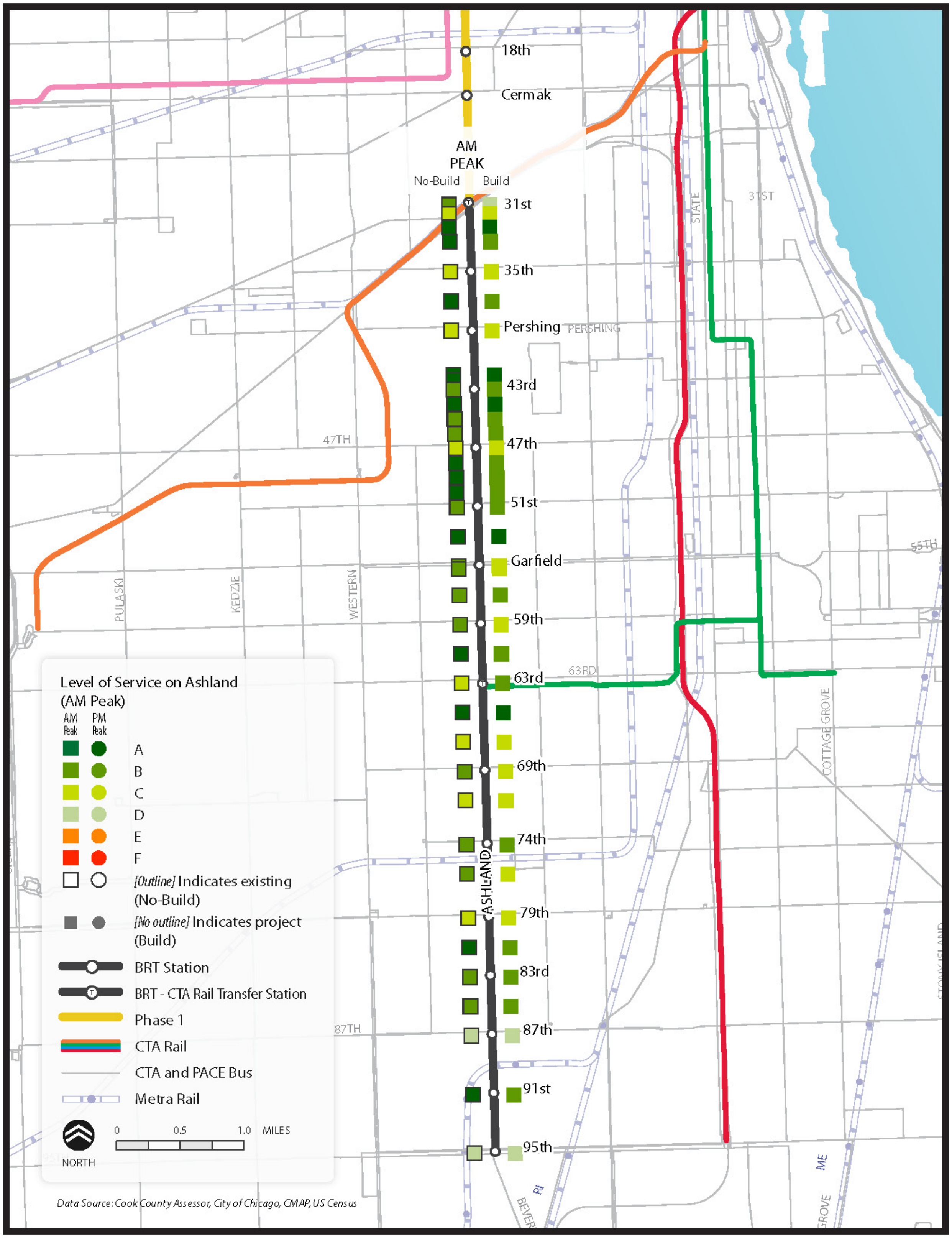
Intersection	Existing		Build		Change	
	AM	PM	AM	PM	AM	PM
Irving Park Road	D□46.2	D□38.7	F□64.9	F□91.3	□45.2	□26.2
Addison Street	D□51.0	C□25.4	E□66.0	D□49.4	□15.0	□24.0
Webster Avenue	C□21.3	C□23.2	C□30.5	E□72.5	□9.2	□49.3
Armitage Avenue	D□41.3	D□37.9	D□40.1	E□62.2	-1.2	□24.3
Cortland Street	B□18.4	C□20.4	E□61.5	E□68.0	□43.1	□47.6
North Avenue	D□40.9	D□39.2	D□42.0	E□59.6	□1.1	□20.4
Augusta Boulevard	B□17.8	C□20.6	C□33.6	F□102.9	□15.8	□82.3

Figure 3-5: Existing and Build Conditions AM Peak Hour Level of Service (1 of 2)



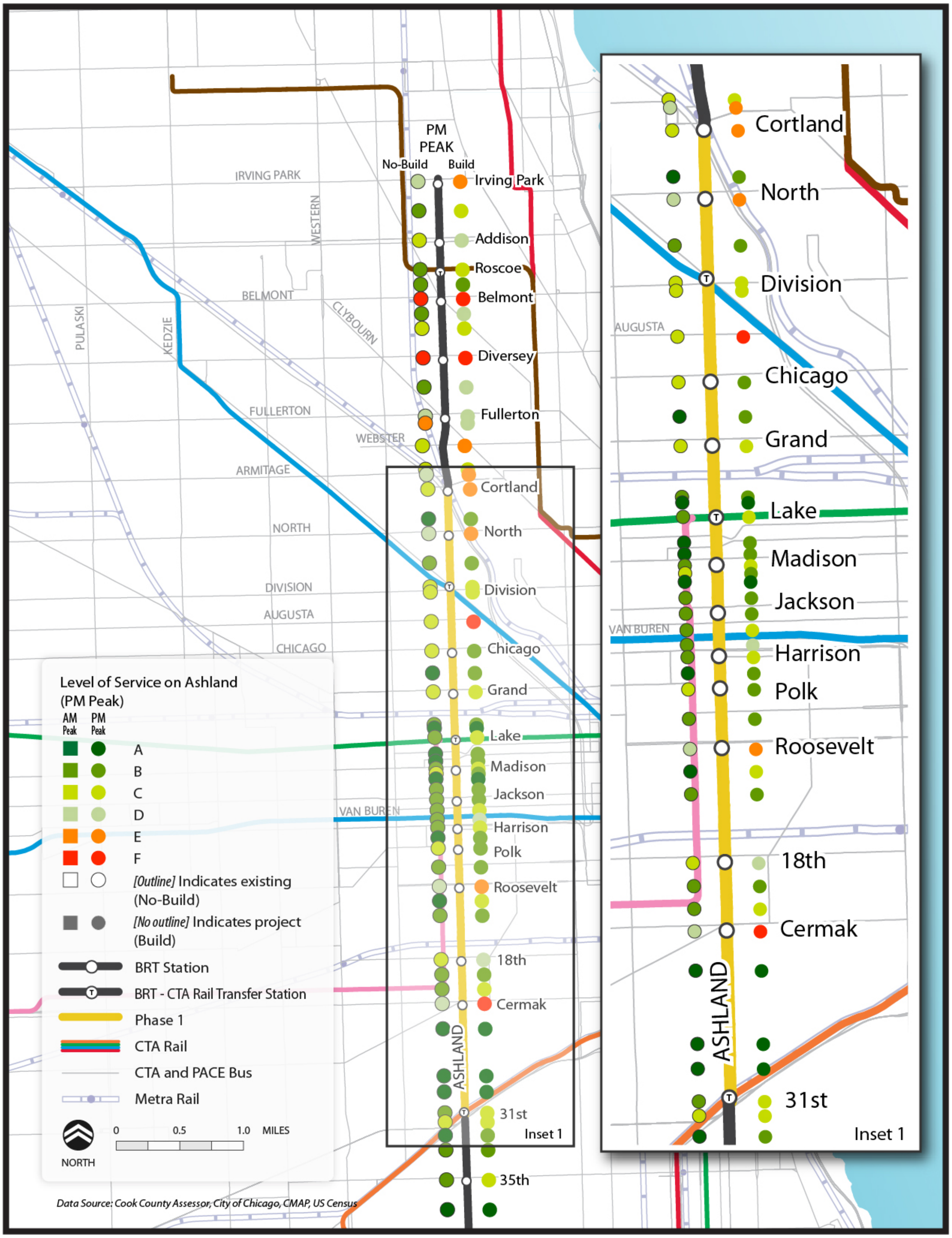
Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 3-6: Existing and Build Conditions AM Peak Hour Level of Service (2 of 2)



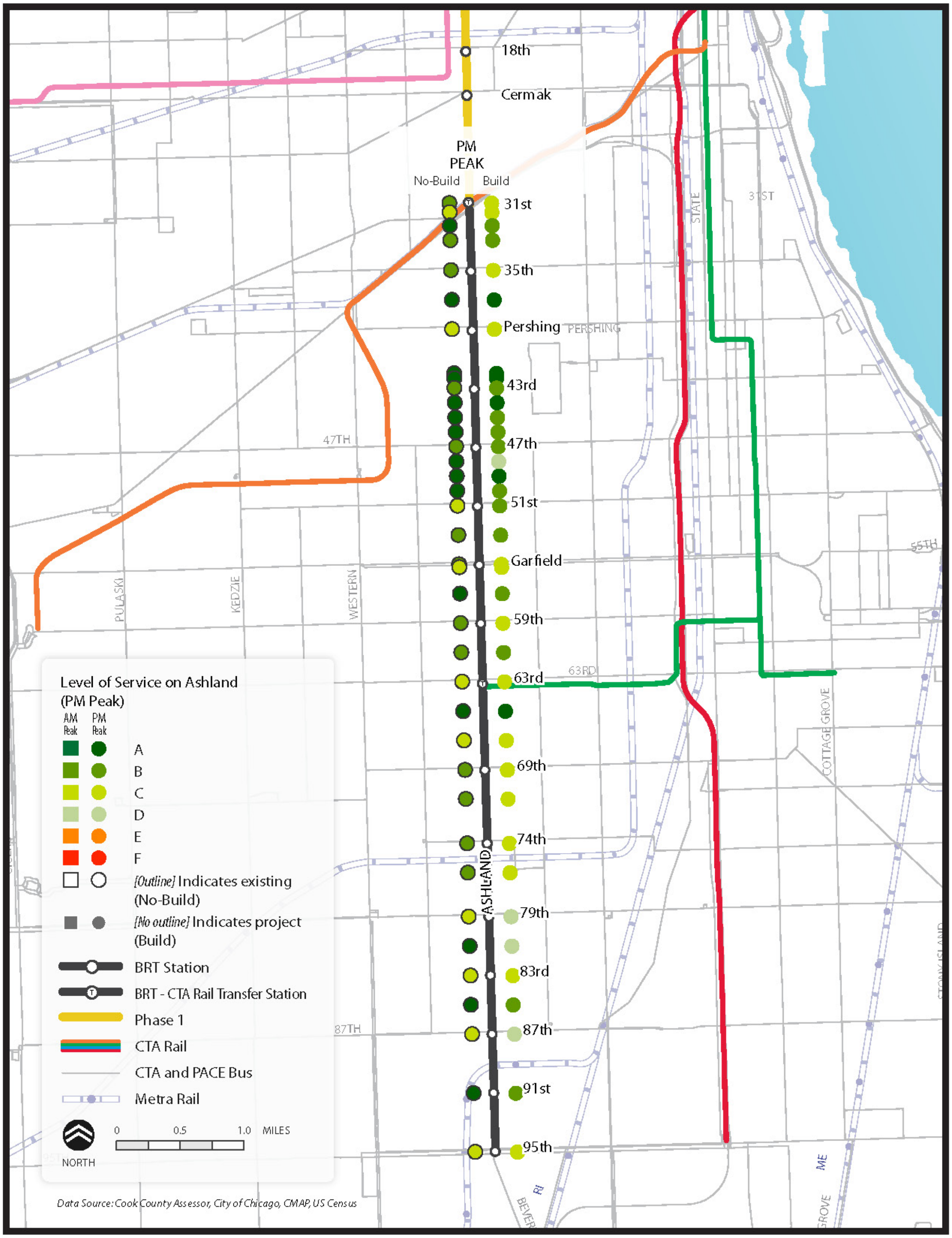
Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 3-7: Existing and Build Conditions PM Peak Hour Level of Service (1 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 3-8: Existing and Build Conditions PM Peak Hour Level of Service (2 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

3.2 Traffic Mitigation

Based on the results of the local and regional impact analysis (**Section 3.1**), potential mitigation measures are identified and discussed in detail in the following section. Implementation of these mitigation measures would result in traffic impacts for this project which would be less than significant. This section includes:

- Overview of Local Impacts and Proposed Mitigation
- Potential Mitigation Measure Options
- Potential Mitigation within Existing Curb-to-Curb Width
- Potential Mitigation outside Existing Curb-to-Curb Width
- Local Traffic Diversion Impacts and Proposed Mitigation

3.2.1 Overview of Local Impacts and Proposed Mitigation

As discussed (in **Section 3.1.4**), 13 of the 89 signalized intersections along the corridor would operate at unacceptable LOS either in the AM, PM or both AM and PM peak hours with implementation of the Build Alternative. This includes the following:

- 6 of 89 intersections with existing deficiencies would continue to operate at unacceptable LOS with the Build Alternative
- 7 of 89 intersections are currently operating at LOS D or better in both the AM and PM peak hours under existing conditions but would operate at unacceptable LOS either in the AM, PM or both AM and PM peak hours with implementation of the Build Alternative.

Potential mitigation measures to reduce or minimize the LOS impacts were evaluated for these intersections along Ashland Avenue. Implementation of these potential mitigation measures would bring all unacceptable intersection LOS under the Build Alternative up to acceptable operating conditions (LOS D or better).

Table 3-7 identifies the results comparing existing conditions and mitigated Build Alternative conditions**.** This shows that mitigation would result in acceptable LOS at these intersections.

3.2.2 Potential Mitigation Measure Options

As described in **Section 2.3**, the Build Alternative is proposed to be implemented within the existing right-of-way. In addition, the project aims to implement the proposed BRT project improvements and any mitigation without adjusting the sidewalk curbs in order to retain existing sidewalk widths and be consistent with CDOT's *Complete Streets Chicago Design Guidelines*[7]. These guidelines established design parameters for all modes of transportation and primarily emphasize walking, bicycling, and public transit.

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[7] Chicago Department of Transportation, Complete Streets Chicago Design Guidelines, 2013. http://www.cityofchicago.org/content/dam/city/depts/cdot/Complete%20Streets/CompleteStreetsGuidelines.pdf

Table 3-7: Ashland Avenue Intersection LOS and Delay (in seconds) with Mitigation

Intersection	Existing		Build with Mitigation		Change	
	AM	PM	AM	PM	AM	PM
Belmont Avenue/ Lincoln Avenue	F□128.2	F□84.8	**D/48.0**	**D/54.2**	**-40.0**	**-17.3**
Diversey Parkway	F□131.7	F□115.6	**D/36.5**	**C/29.7**	**-95.2**	**-85.9**
Clybourn Avenue	E□74.9	E□73.5	D□48.7	D□48.1	-26.2	-25.4
Van Buren Street	F□94.4	B□18.7	D□51.1	D□38.5	-43.3	□19.8
Roosevelt Road	E□59.7	D□50.3	D□44.1	D□49.1	-15.6	-1.2
Cermak Road/ Blue Island Avenue	E□68.1	D□51.5	**D/50.1**	**D/41.6**	**-18.0**	**-9.9**
Irving Park Road	D□46.2	D□38.7	**D/53.9**	**D/42.3**	**+7.7**	**+3.6**
Addison Street	D□51.0	C□25.4	D□41.4	C□30.8	-9.6	□5.4
Webster Avenue	C□21.3	C□23.2	C□23.0	D□44.6	□1.7	□21.4
Armitage Avenue	D□41.3	D□37.9	**C/33.7**	**D/43.7**	**-7.6**	**+5.8**
Cortland Street	B□18.4	C□20.4	**C/31.6**	**C/32.6**	**+13.2**	**+12.2**
North Avenue	D□40.9	D□39.2	**C/32.4**	**D/50.2**	**-8.5**	**+11.0**
Augusta Boulevard	B□17.8	C□20.6	C□26.5	D□50.5	□8.7	□29.9

Note: Mitigation measures that require increasing the curb-to-curb width at intersections are shown in **bold.**

For the 13 intersections listed in **Table 3-7**, potential mitigation measures within the existing curb-to-curb width were evaluated to achieve an acceptable LOS. The mitigation measures include modifying existing lane configurations, adding or extending left- and right-turn lanes to create more storage space for turning vehicles, and adjusting the traffic signal timing schemes to provide better traffic progression. It would be possible to implement these mitigation measures within the existing roadway width for six of the 13 intersections.

At the remaining seven intersections it would not be possible to implement mitigation measures within the existing curb-to-curb width and achieve an acceptable LOS. For these intersections, widening the roadway width to implement mitigation measures was also evaluated. While these physical improvements would result in an acceptable LOS at these intersections, they would require reductions to sidewalk and median widths. These mitigation efforts would be inconsistent with CDOT□s *Complete Streets Chicago Design Guidelines* and additional coordination with agencies and stakeholders would be needed prior to implementation of these options.

3.2.3 Potential Mitigation within Existing Curb-to-Curb Width

Potential mitigation measures that could be accommodated within the existing curb-to-curb widths and which would retain existing sidewalk widths were tested first for the intersections with unacceptable LOS. Mitigation measures would only be possible to implement within the existing curb-to-curb widths for six of the 13 intersections. These potential mitigation measures are described in detail below for these six intersections.

- Clybourn Avenue – Potential mitigation measures to bring this intersection up to acceptable LOS during both AM and PM peak hours include removing parking on Clybourn Avenue to accommodate an additional eastbound through lane on Clybourn Avenue.

  This intersection currently operates at an unacceptable LOS E during AM and PM peak hours. With implementation of the Build Alternative, LOS during AM peak hours would continue to operate at unacceptable LOS E and operations during PM peak hours would be slightly improved to acceptable LOS D. With implementation of these mitigation measures, this intersection would operate at LOS D during AM and PM peak hours.

- Van Buren Street – Potential mitigation measures to bring this intersection up to acceptable LOS for both AM and PM peak hours include modifying the existing westbound through lane to a westbound left-turn lane for dual left-turn lanes on Van Buren Street and modifying the inside northbound through lane to a shared through-left-turn lane on Ashland Avenue.

  This intersection currently operates at an unacceptable LOS F during AM peak hours and LOS B during PM peak hours. With implementation of the Build Alternative, this intersection would continue to operate at unacceptable LOS E during AM peak hours and continue to operate at acceptable LOS C during PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS D during AM and PM peak hours.

- Roosevelt Road – Potential mitigation measures to bring this intersection up to acceptable LOS during both AM and PM peak hours include adding an eastbound through lane on Roosevelt Road and adjusting parking and bike lanes on Roosevelt Road to allow diverging and merging zones for general traffic.

  This intersection currently operates at unacceptable LOS E during AM peak hours and acceptable LOS D during PM peak hours. With implementation of the Build Alternative, this intersection would operate at acceptable LOS D during AM peak hours and unacceptable LOS E during PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS D during AM and PM peak hours.

- Addison Street – Potential mitigation measures to bring this intersection up to acceptable LOS during both AM and PM peak hours include removing parking on Addison Street to accommodate eastbound and westbound through lanes on Addison Street.

The Addison Street and Ashland Avenue intersection currently operates at acceptable LOS D during AM peak hour and LOS C during PM peak hour. With implementation of the Build Alternative, this intersection would operate at unacceptable LOS E during AM peak hours and acceptable LOS D during PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS D during AM peak and LOS C during PM peak hours.

- Webster Avenue □ Potential mitigation measures to bring this intersection up to acceptable LOS during both AM and PM peak hours include adding northbound and southbound right-turn lanes on Ashland Avenue.

  This intersection currently operates at acceptable LOS C during both AM and PM peak hours. With implementation of the Build Alternative, this intersection would operate at acceptable LOS C during AM peak hours and unacceptable LOS E during PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS C during AM peak and LOS D during PM peak hours.

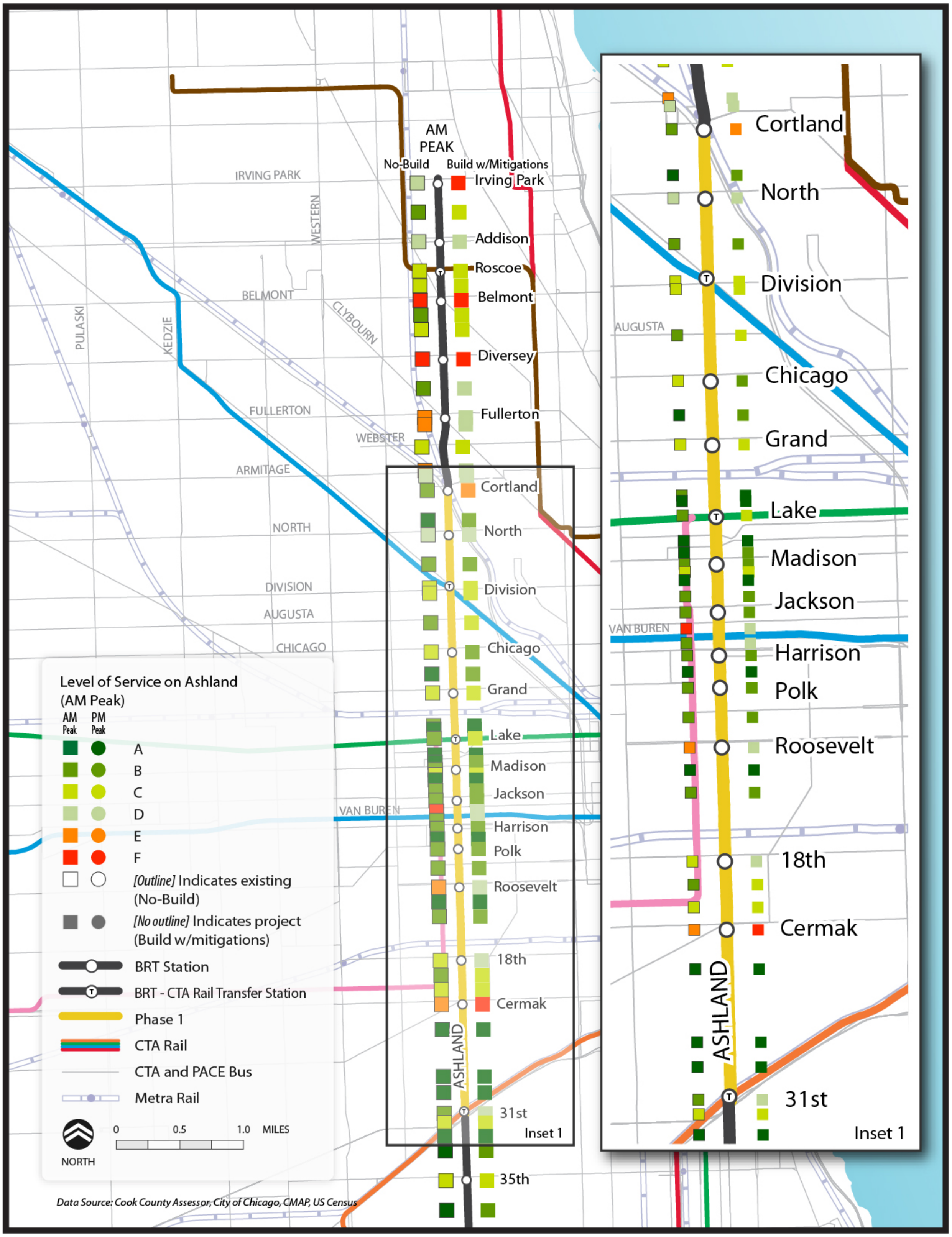
- Augusta Boulevard □ Potential mitigation measures to bring this intersection up to acceptable LOS during both AM and PM peak hours include adding northbound and southbound right-turn lanes on Ashland Avenue at Augusta Boulevard.

  This intersection currently operates at acceptable LOS B during the AM peak period and LOS C during the PM peak hour. With implementation of the Build Alternative, this intersection would continue to operate at acceptable LOS C during AM peak hours and unacceptable LOS F during PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS C during AM peak and LOS D during PM peak hours.

Implementation of these mitigation measures within the existing roadway width would bring six of the 13 intersections, which would operate at unacceptable LOS under the Build Alternative, to acceptable LOS standards. **Figures 3-9** through **3-12** show the LOS for Existing and Build Alternative with these mitigation measures included.

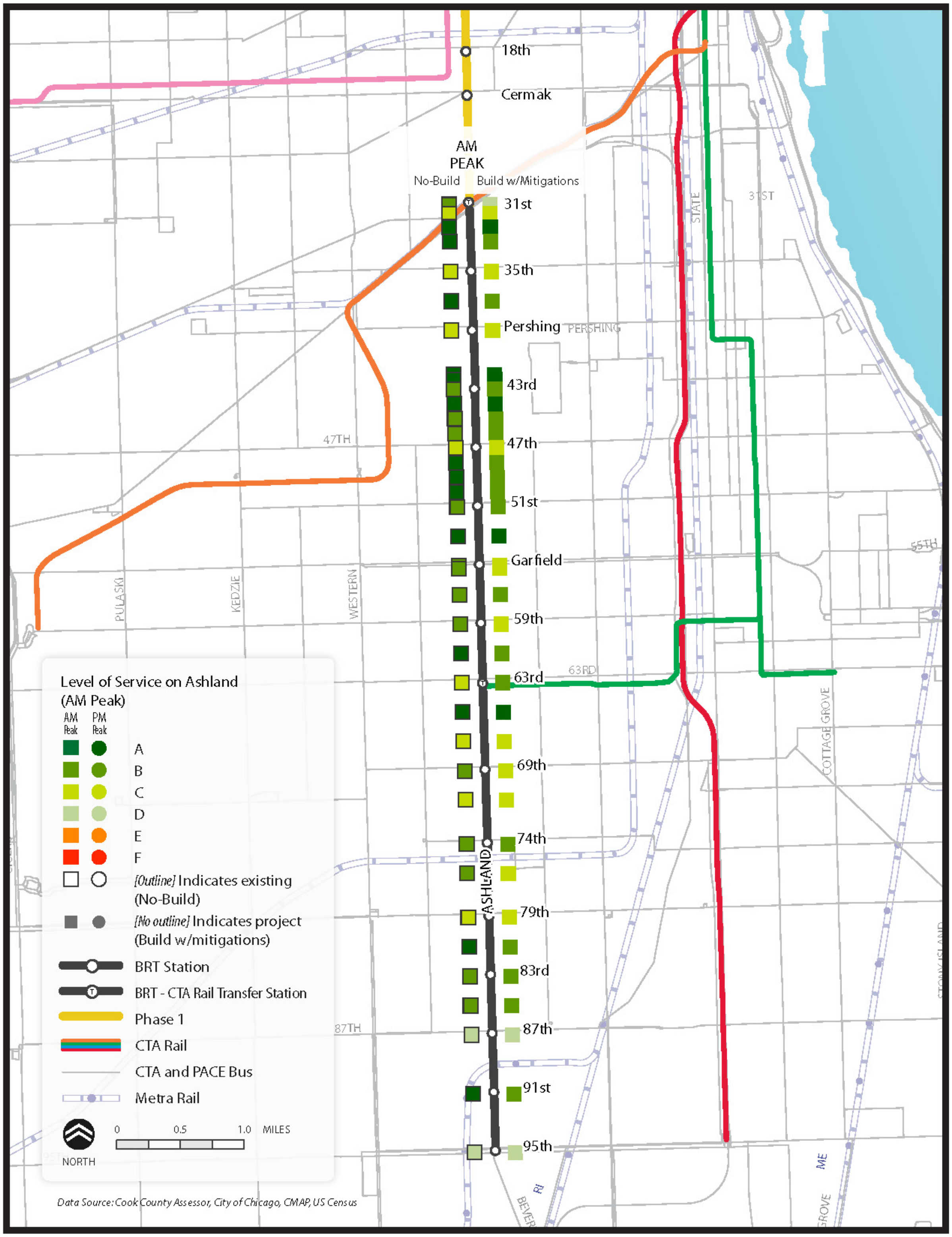
Concept plans depicting the potential mitigation for these intersections are included in **Appendix B-3**.

Figure 3-9: Existing and Mitigated (inside curb-to-curb) Build Conditions AM Peak Hour Level of Service (1 of 2)



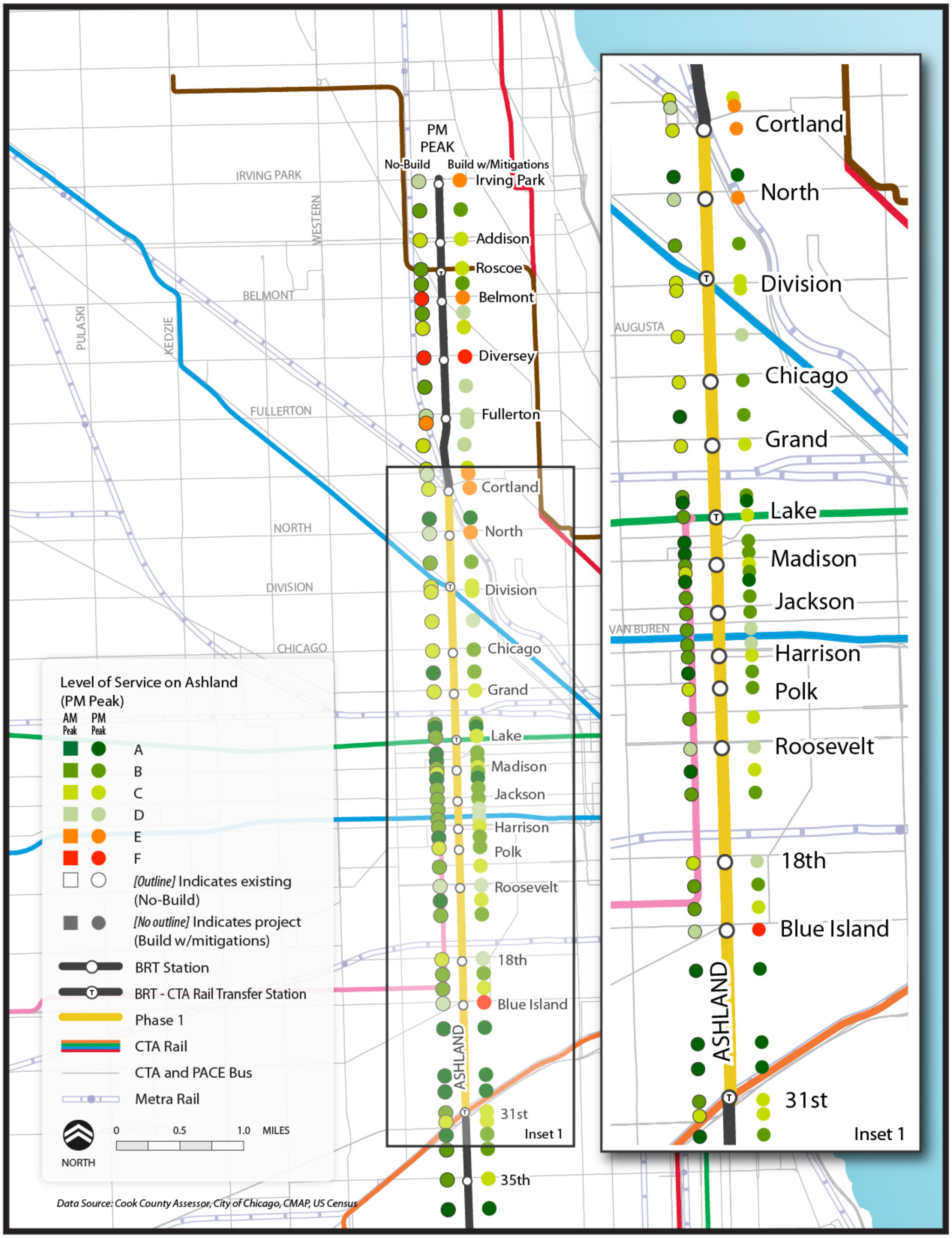
Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 3-10: Existing and Mitigated (inside curb-to-curb) Build Conditions AM Peak Hour Level of Service
(2 of 2)



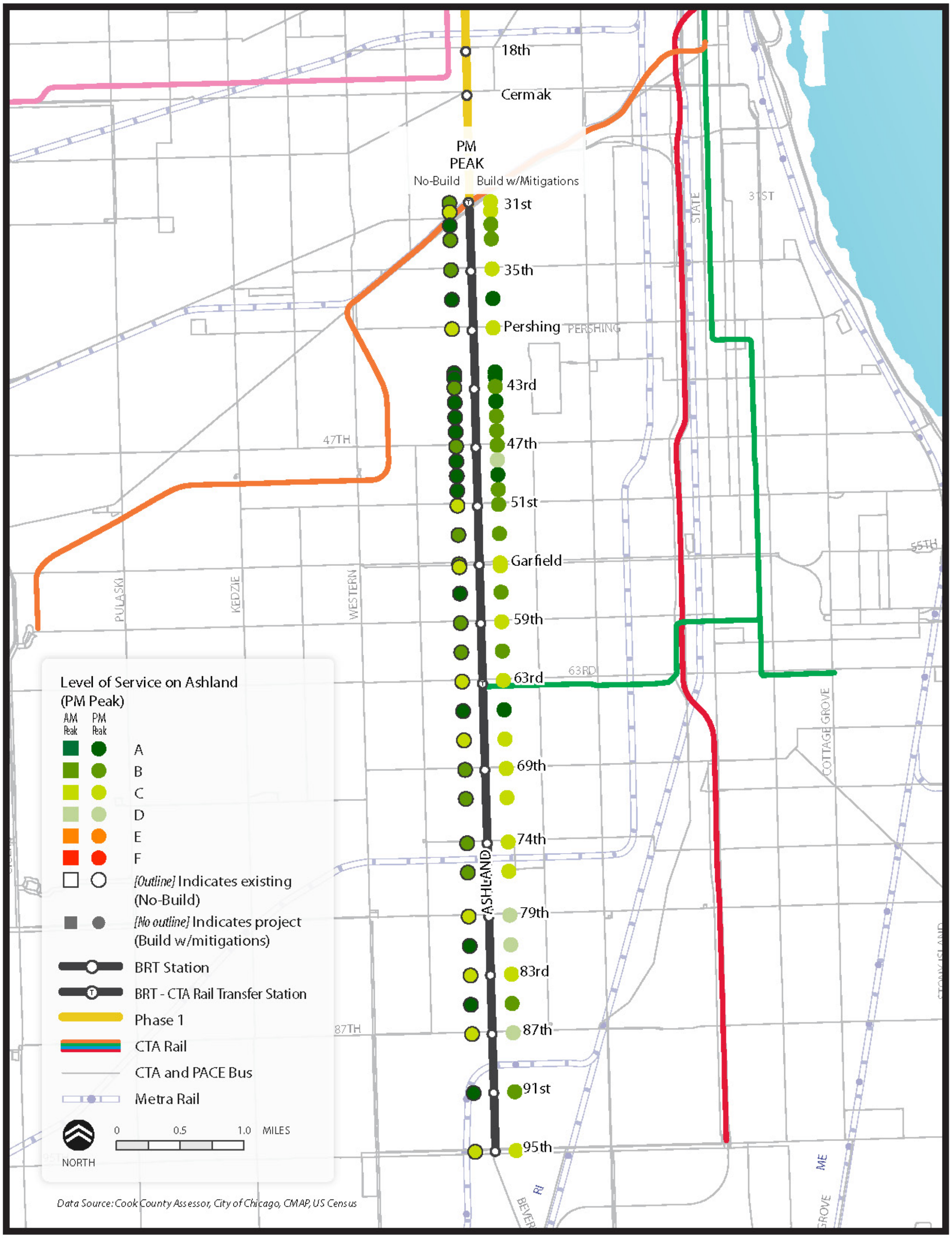
Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 3-11: Existing and Mitigated (inside curb-to-curb) Build Conditions PM Peak Hour Level of Service (1 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 3-12: Existing and Mitigated (inside curb-to-curb) Build Conditions PM Peak Hour Level of Service (2 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

3.2.4 Potential Mitigation outside Existing Curb-to-Curb Width

At seven intersections mitigation is not possible within the existing curb-to-curb width. For these locations, potential mitigation measures outside of the existing curb-to-curb width were also tested. While these physical improvements provide the ability to improve LOS at these intersections, they would require reductions to sidewalk and median widths in order to provide an additional through or turn lane. These mitigation efforts would be inconsistent with CDOT’s *Complete Streets Chicago Design Guidelines* and additional coordination would be needed prior to implementation of these measures. These potential mitigation efforts are described in detail below for the seven intersections.

- Belmont Avenue/Lincoln Avenue – Potential mitigation measures outside of the existing curb-to-curb width to bring this intersection up to acceptable LOS during both AM and PM peak hours would include removing parking on Belmont Avenue to accommodate additional eastbound and westbound through lanes on Belmont Avenue, and adding southeast bound and northwest bound through/right-turn lanes on Lincoln Avenue.

  This intersection currently operates at an unacceptable LOS F during AM and PM peak hours. With implementation of the Build Alternative, this intersection would continue to operate at unacceptable LOS F during AM and PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS D during AM and PM peak hours.

- Diversey Parkway – Potential mitigation measures outside of the existing curb-to-curb width would include removing parking on Diversey Parkway to accommodate adding eastbound and westbound through lanes on Diversey Parkway and adding northbound and southbound through lanes on Ashland Avenue.

  This intersection currently operates at an unacceptable LOS F during AM and PM peak hours. With implementation of the Build Alternative, this intersection would continue to operate at unacceptable LOS F during AM and PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS D during AM peak and LOS C during PM peak hours.

- Cermak Road/Blue Island Avenue – Potential mitigation outside of the existing curb-to-curb width would include installing an additional northeast bound through lane on Blue Island Avenue and adding northbound and southbound through lanes by converting existing right-turn lanes into shared through/right-turn lanes on Ashland Avenue.

  This intersection currently operates at unacceptable LOS E during AM peak hours and acceptable LOS D during PM peak hours. With implementation of the Build Alternative, this intersection would continue to operate at unacceptable LOS F during AM and PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS D during AM and PM peak hours.

- Irving Park Road □ Potential mitigation outside of the existing curb-to-curb width would include adding a westbound through lane on Irving Park Road and a southbound through lane on Ashland Avenue.

  This intersection currently operates at acceptable LOS D during both AM and PM peak hours. With implementation of the Build Alternative, this intersection would operate at unacceptable LOS F during both AM and PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS D during AM and PM peak hours.

- Armitage Avenue □ Potential mitigation outside of the existing curb-to-curb width would include adding an additional eastbound left-turn lane and widening under the railroad bridge over the west leg on Armitage Avenue.

  This intersection currently operates at acceptable LOS D during both AM and PM peak hours. With implementation of the Build Alternative, this intersection would continue to operate at LOS D during AM peak hours and at unacceptable LOS E during PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS C during AM peak and LOS D during PM peak hours.

- Cortland Street □ Potential mitigation outside of the existing curb-to-curb width would include adding northbound and southbound turn lanes, widening under the railroad bridge over the north leg of Ashland Avenue, and widening under the railroad bridge over the east leg of Cortland Street.

  This intersection currently operates at acceptable LOS during both AM (LOS B) and PM (LOS C) peak hours. With implementation of the Build Alternative, this intersection would operate at LOS E during AM and PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS C during AM and PM peak hours.

- North Avenue □ Potential mitigation outside of the existing curb-to-curb width would include adding eastbound and westbound through lanes (one in each direction) on North Avenue.

  This intersection currently operates at acceptable LOS D during both AM and PM peak hours. With implementation of the Build Alternative, this intersection would continue to operate at LOS D during AM peak hours and LOS E during PM peak hours. With implementation of these mitigation measures, this intersection would operate at LOS C during AM peak and LOS D during PM peak hours.

In summary, under mitigated Build Alternative conditions that could be accommodated within the existing curb-to-curb widths, six of the 13 intersections would operate at LOS D or better in both the AM and PM peak hours, while seven intersections would operate at LOS E or F in either the AM or PM peak hours or both AM and PM peak hours. Under mitigated Build Alternative conditions including increasing the existing curb-to-curb widths, all of the thirteen intersections would operate at LOS D or better in both the AM and PM peak hours.

CTA and CDOT would continue to work through final design on mitigation options for these thirteen intersections. For improvements identified within the existing curb-to-curb widths, CTA and CDOT would continue to coordinate with CCDOTH and IDOT through final design on implementation of these mitigation options. Recognizing that mitigation measures outside of the existing curb-to-curb would be inconsistent with CDOT's *Complete Streets Chicago Design Guidelines*, these mitigation measures would need to be further coordinated with CDOT and go through additional public outreach processes before implementation.

3.2.5 Local Traffic Diversion Impacts and Proposed Mitigation

Based on the diversion analysis detailed in **Section 3.1.3**, two levels of diversion mitigation are proposed to address potential impacts of the Build Alternative: (1) potential mitigation related to parallel roadways which represent the most likely alternative roadways for diversion of traffic and (2) potential mitigation measures related to neighborhood level impacts of traffic diversion. Implementation of these proposed mitigation measures would result in diversion impacts which would be less than significant.

While the diversion analysis conducted indicates that no one parallel roadway would absorb the majority of diverted traffic, operational improvements are proposed to minimize impacts of potential increases in traffic demand on major parallel roadways (as identified in **Table 3-2**). The mitigation measures on these parallel roadways would include the following: (a) upgrading traffic signal equipment, (b) coordinating traffic signal timing and traffic progression plans, or (c) providing additional turn lanes. Another option that would be considered involves providing additional transit, bicycle, or pedestrian accommodations along these roadways.

The specific locations for these mitigation measures would be determined in final design. CTA and CDOT are committed to developing block-by-block, location-specific diversion mitigation plans in coordination with IDOT and other stakeholders through final design and construction. Once location-specific parallel roadway mitigation plans are finalized, additional analysis would also review the localized impacts of removing left turn lanes from Ashland Avenue. Improvements would be developed and recommended to target specific neighborhood-level impacts while minimizing changes to the existing transportation network.

CTA and CDOT would continue to work with the local community through final design and implementation to ensure that both diversion impacts on major arterials and on neighborhood streets are mitigated. In the case where diversion occurs outside of the modeled results, mitigation measures would be utilized to address potential neighborhood-level traffic diversion impacts and local traffic calming needs (that may arise subsequent to implementation). These mitigation measures would include: geometric changes, signal installation, access changes, and traffic calming measures – that is, measures added to local roadways that are designed to reduce speeds or traffic levels.

The following represent the most likely traffic calming measures that would be implemented in the study area. These measures are identified in CDOT's *Tools for Safer Streets*[8] and have been proven to lessen the impact of additional vehicular traffic and make intersections, corridors, and neighborhood streets safer for pedestrians. Many of the traffic calming measures described below already exist along roadways within the diversion analysis study area and have been successful at providing neighborhood-specific mitigation measures to traffic impacts. These include:

- Marked crosswalks – Indicate where pedestrians may cross the street and where drivers should expect them to cross.
- In-road state law "Stop for Pedestrians" signs – State and City law require that vehicles must stop for pedestrians who are in a crosswalk and in-road signs remind drivers of this law.
- Pedestrian refuge islands – Protected area that allows pedestrians to cross one direction of traffic at a time.
- Accessible pedestrian signals – Provides auditory and/or vibrotactile information to pedestrians that are blind.
- Pedestrian countdown timers – Provide information on the amount of time remaining to cross the street at signalized intersections.
- Speed feedback signs – Display passing vehicle speeds and have been shown to increase driver compliance with the speed limit.
- Vertical traffic calming – Speed bumps, speed humps, and speed tables are devices that are placed in the middle of the road and require vehicles to slow down to cross over them.
- Bump-outs – Extend the sidewalk into a parking or non-moving lane, which reduce vehicle turning speeds and pedestrian crossing distance.
- Neighborhood traffic circles – Circular islands used to reduce vehicular speeds through the intersection.

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[8] City of Chicago Department of Transportation, 2013. Tools for Safer Streets.
http://www.cityofchicago.org/content/dam/city/depts/cdot/street/general/ToolsforSaferStreetsGuide.pdf

In addition, CDOT’s *Tools for Safer Streets* provides other traffic calming measures which have been implemented in Chicago and may also be considered as part of final design plans. These include:

- Signals and beacons – Traffic signals provide a protected crossing and inform pedestrians when to cross the street. Pedestrian hybrid beacons stop traffic to allow pedestrians to cross. Rectangular rapid flash beacons can be used as a warning device at uncontrolled or midblock crossings.
- Leading pedestrian intervals – Gives pedestrians a head start into an intersection before vehicles.
- Lagging left turns – Allows pedestrians to cross the intersection at the beginning of a traffic signal cycle, reducing the conflicts with left-turning vehicles.
- Road diets – Reduces the amount of space for motor vehicles, either through eliminating lanes or shrinking the width of lanes. The reclaimed space from a road diet is then re-allocated for other uses, such as turn lanes, pedestrian refuge islands, bike lanes, or more sidewalk space.
- Roundabouts – Circular intersections where vehicles travel in a counter-clockwise direction and entering vehicles must slow down and yield to circulating vehicles.
- Chicanes – Create extra turns in a road by installing a series of midblock bump-outs on alternating sides of the streets that require vehicles to slow down to maneuver through them.
- Skinny streets – Convert one-way streets that are wider than 30 feet to two-way streets with narrow travel lanes that reduce vehicle speeds.

As noted, the above lists include potential traffic calming measures identified in CDOT’s *Tools for Safer Streets*[8]. CTA and CDOT would continue to coordinate with other agencies and work with the local community before implementing any of these mitigation options.

3.3 Parking Impact Analysis

In order to accommodate center running bus-only lanes within the existing right-of-way, one of the design features for the Ashland Avenue BRT Project would include removal of on-street parking near station locations along the corridor. Detailed design solutions for station intersections, including the provision of left turns at certain locations to provide sufficient residential and business access, would be determined through conceptual engineering and into final design in coordination with agency partners and the public involvement process. The results of this process would define the exact number of parking spaces at each location. As such, the detailed parking impact analysis conducted for this Environmental Assessment (EA) takes into account conceptual engineering to identify the parking impacts that would likely occur from implementation of the Build Alternative.

This section details the existing parking inventory along the corridor and the results of a parking demand analysis that was undertaken as part of the planning for this project. A discussion of the parking impacts and ways to avoid, minimize, or mitigate impacts to nearby residential or business communities is also provided for the purposes of this EA. CTA would continue to work with the public and the City of Chicago through final design and construction to coordinate and address impacts resulting from the removal of on-street parking along portions of the Ashland Avenue corridor.

3.3.1 Changes to Parking Supply

Parking represents the total on-street parking spaces, on both sides of the street, including loading zones, metered parking spaces, and unmetered parking spaces, within the corridor. Parking space impact estimates were developed based on the conceptual roadway alignment and station layout design for the Build Alternative. There are approximately 3,410 parking spaces along the corridor. The majority (approximately 83 percent) of these spaces are located at unpaid or unmetered parking spaces. In many of these locations along the corridor, parking stalls are not marked. The Build Alternative would remove between approximately 11 to 12 percent of total on-street parking along the corridor, retaining between 88 to 89 percent of total parking.

The Institute for Transportation and Development Policy (ITDP) conducted an assessment in June 2012 of existing parking within the project area to identify whether adjacent cross street parking was available to offset any changes to parking within the corridor. The full report of this analysis is included in **Appendix C**. Since the analysis was initially conducted, the total parking supply has been refined through field visits and additional review of aerial photographs. However, the results of the ITDP evaluation provide the necessary information to assess whether comparable parking exists to address parking losses. The results of this analysis indicate the presence of underutilized on-street and off-street parking owned and operated by various parties at cross streets which would provide suitable parking alternatives.

Adequate comparable parking is not available at cross streets at two discrete locations along the project corridor □ from Thomas Street to Erie Street, and from 47th Street to 50th Street. No stations are proposed at Thomas Street or Erie Street, and all existing parking would be retained along this section of Ashland Avenue. The 47th Street station is proposed between 47th and 50th Street. In this section, parking would be retained along Ashland Avenue, except in close proximity to the proposed station location at 47th Street. An estimated 23 unmetered parking spaces (total for both sides of the roadway) may be removed for implementation of the Build Alternative; existing on-street parking would continue to be available near this location, and residents and businesses near this proposed station location would benefit from enhanced access to the area through the BRT service.

3.3.2 Parking Demand Analysis

Parking supply only represents one factor needed to understand parking impacts. A parking demand analysis was completed in August 2012 to build on the parking inventory data gathered and to identify maximum and average parking use in different sections of the corridor. To conduct this analysis, field teams were deployed over an eight-day period in July 2012 to survey average and maximum parking. For representative coverage, field surveys were conducted for Monday through Thursday as well as on Saturday and Sunday of the same week.

Surveyors recorded the presence of parked vehicles on each block throughout the corridor and measured six temporal data sets:

- Early AM peak (6 AM □7 AM)
- AM peak (7 AM □9 AM)
- Midday (9 AM □4 PM)
- PM peak (4 PM □6 PM)
- Evening (6 PM □9 PM)
- Weekend (All Saturday and Sunday)

Summary results of this analysis are shown in **Table 3-8**, which includes percent use based on the current parking space estimate of 3,410. Previously, a 2012 study by ITDP estimated the number of available parking spaces as 3,676. As described in **Section 3.3.1**, subsequent to the ITDP report, the parking space estimate was refined to 3,410. Additional details on analysis findings by ward are included in **Appendix C**.

Based on the parking demand analysis, the average observed parking use was highest for the midday and Saturday service periods. Maximum use was higher than average use, although roughly one-third of the total parking capacity was observed as unused along the corridor. Given these factors, the minimal total parking anticipated to be converted for implementation of the Build Alternative were not deemed to be of significant impact to residents or businesses. Residents and businesses would benefit from increased access through premium BRT service along the corridor with enhanced pedestrian access to these areas.

Table 3-8: Ashland Avenue Average Parking Demand

Average Parking		% Use
Early AM Peak*	6 AM □7 AM	22□
AM Peak	7 AM □9 AM	27□
Midday	9 AM □4 PM	40□
PM Peak	4 PM □6 PM	35□
Evening	6 PM □9 PM	34□
Saturday		41□
Sunday		36□

Maximum Use of Parking	% Use
Weekday	73□
Saturday	55□
Sunday	54□

□Counts were not completed for the entire corridor.

3.3.2 Summary of Parking Impacts

Initial estimates for the Build Alternative assume retaining approximately 89 percent of parking along the corridor. Implementation of the intersection mitigation measures detailed in **Section 3.2.2** would require the removal of additional parking spaces. The result of these mitigation measures would result in approximately 88 percent of the parking retained along the corridor. Given the analysis of parking supply and demand and the availability of comparable parking along adjacent streets throughout the majority of the corridor, no specific parking mitigation is proposed at this time. Minimal impacts are anticipated to occur to paid parking or loading zone parking, and through much of the Ashland Avenue corridor, parking stalls are not clearly marked or currently fully utilized. In addition, parking demand analysis conducted indicates that roughly one-third of the total parking capacity was observed as unused along the corridor. CTA and CDOT would continue to work with the public through final design and construction as localized concerns are determined and addressed.

Comparable parking would continue to be available at cross streets near BRT stations to serve residents and businesses. Outside of station areas, on-street parking would be retained and no loading zones would be impacted. Any additional changes to parking would be based on local decision-making regarding preferred access and local traffic concerns. These decisions would be identified and coordinated through the public involvement process and with the City of Chicago (DHED) as part of stakeholder outreach efforts in final design.

3.4 Transit Operational Analysis

The proposed Ashland Avenue BRT Project would bring a new, premium mode of transit service to CTA's highest bus ridership route along Ashland Avenue from Irving Park Road in the north to 95th Street in the south (16.1 miles). The first phase (Phase 1) of design and construction would be located between Cortland Street in the north and 31st Street in the south (5.4 miles). While construction of BRT median stations, center running bus-only lanes and TSP upgrades would first be constructed in this area, limited stop service would be provided throughout the entire 16.1-mile corridor at the proposed BRT station locations using existing curbside bus stops until Phase 2 is constructed. The BRT vehicles would include doors on both sides of the vehicle in order to serve (1) the median stations and (2) existing curbside bus stops until Phase 2 is constructed. Conceptual plans for the Build Alternative, indicating the layout for both Phase 1 and Phase 2 are included in **Appendix G**. Corridor design in Phase 2 would be similar to that in Phase 1 and would include center running, dedicated BRT lanes and center median stations. Details on the proposed phasing plan are provided in **Section 2.3**.

A trademark of BRT is increased frequency and capacity of service compared to regular bus service. The Ashland Avenue BRT Project is anticipated to operate at between five and 15 minute headways in peak and off-peak hours. The BRT service would operate from 4:00 a.m. to 1:00 a.m., a span of service of 21 hours per day. CTA estimates that the total number of buses required to operate BRT peak and off-peak service with the proposed headways would be 12 vehicles (peak) and four vehicles (off-peak) in each direction for the 16.1-mile corridor.

Existing local CTA Bus Route #9 bus service would continue to operate in a similar manner as today when Phase 1 is implemented. Due to expected ridership shifts from Route #9 to the faster and more reliable BRT service, Route #9 frequency may be adjusted once the BRT service has matured. CTA is committed to maintaining Route #9 to provide local bus service as a complement to the BRT service. This configuration of service provides benefits to customers making both local and express transit trips.

There are 35 proposed BRT station locations that would be implemented approximately every half mile and at CTA rail stations to provide faster and more reliable service in the corridor, with fewer stops than the existing bus service. As mentioned above, the Route #9 service would continue to operate as it does currently, stopping at every bus stop (approximately every one-eighth of a mile) along the corridor.

Under the Build Alternative, improvements to pedestrian crossings and enhanced access to adjacent transit facilities would be provided at station locations, with increased amenities at BRT stations compared to local bus stops. These improvements to the pedestrian environment are proposed along with complete streets design considerations (i.e., designs that consider all users of the roadway), such as special sidewalk and curb design, to create an integrated and holistic transportation network in the corridor that not only accommodates all modes, but which would accommodate all users of the transit service and pedestrian environment. CTA and CDOT have both established complete streets design guidelines that would be incorporated into final design. CDOT's *Complete Streets Chicago Design Guidelines*[9] and CTA's *Transit Friendly Design Guide*[10] would be used to ensure that the design of stations and crossings fit the form and function of adjacent land uses and roadway typologies within the corridor.

Potential benefits to the transit system as a result of the Build Alternative which are discussed within the context of this EA include:

1. Travel Time and Reliability Changes
2. Changes to Transit Patronage and Demand
3. Station Access and Pedestrian Space

The following presents the summary of findings in each of these areas. A description of the methodologies used and detailed data inputs and results are located in **Appendix D.** Potential temporary impacts on transit operations resulting from implementation of Phase 1 are also discussed.

3.4.1 Travel Time and Reliability Changes

Three transit operational factors were estimated and evaluated to determine the benefits to travel time and reliability of the Build Alternative, as follows:

- *Bus Speed* – Bus speed represents average bus speed along the corridor under peak hour travel conditions during a typical weekday. Implementation of the Build Alternative would increase average speed along the corridor to 15.9 miles per hour, an increase in bus speed up to 83 percent compared to existing local bus service on the corridor. Additional bus speed increases would result from buses operating in dedicated lanes, increased station spacing compared to current local bus stops, the potential for off-board fare collection to further reduce bus dwell times, TSP improvements, left-turn removal at intersections and traffic signal optimization. Route □9 would continue to operate in a general purpose traffic lane and stop at all existing local bus stops. Existing Route □9 average speed is 8.7 miles per hour during peak periods and is less than projected general purpose traffic average speed of 12.8 mile per hour during peak periods. Route □9 may experience minor delays associated with the reduction in general purpose traffic lanes. However, these minor impacts to local bus speeds would be offset by the substantial increases in speed of the BRT service that would provide riders with more efficient options to reach their destinations.

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[9] Chicago Department of Transportation, Complete Streets Chicago Design Guidelines, 2013. http://www.cityofchicago.org/content/dam/city/depts/cdot/Complete%20Streets/CompleteStreetsGuidelines.pdf

[10] Chicago Transit Authority, Transit-Friendly Development Guide: Station Area Typology, 2009. http://www.cityofchicago.org/dam/city/depts/zlup/Planning_and_Policy/Publications/Transit_Friendly_Development_Guide/CTA_Typology_Study.pdf

- *Bus Travel Time* □ Bus travel time represents travel time along the corridor under peak hour travel conditions during a typical weekday for average trip lengths. Bus travel time under the Build Alternative is anticipated to decrease to 9.4 minutes for a typical 2.5-mile trip, representing an approximately 45 percent travel time savings for passengers of the BRT service. These time savings are realized from BRT operating in center running dedicated bus-only lanes and having fewer stops than the local bus service. Route □9 is anticipated to maintain existing travel time for riders since impacts to local bus speed are anticipated to be minimal and to be offset by the substantial gains in travel time associated with the Build Alternative.

- *Bus Reliability* □ Bus reliability represents the on-time performance of buses compared to the published schedule under daily travel conditions during a typical weekday and is measured in average extra wait time. The Build Alternative would operate in a dedicated center lane, resulting in bus reliability improvements of almost 50 percent (43 seconds is the existing extra wait time compared to the schedule versus 22 seconds of extra wait time projected under the Build Alternative). Route □9 would continue to operate in a general purpose traffic lane and stop at all existing local bus stops. Route □9 may experience minor delays leading to a minor reduction in bus reliability associated with the reduction in general purpose traffic lanes. However, the impact to the overall Route □9 reliability would be less than significant due to the substantial increases to overall transit service (BRT and local bus) with the Build Alternative.

In sum, the Build Alternative would result in overall increased bus speeds and greater reliability along the corridor through the implementation of center running, dedicated lanes for the BRT service, limited stop locations for BRT service, level boarding with the potential for off-board fare collection at BRT stations to further reduce bus dwell times, TSP improvements, left-turn removal at intersections, and traffic signal optimization.

Off-board fare collection □ Customers pre-pay their fare at the station prior to boarding the transit vehicle.

Dwell Time = The time a bus spends at a stop loading and unloading passengers.

Implementation of the Build Alternative is anticipated to result in

- improved travel times,
- greater schedule reliability,
- easier transfers,
- shorter wait times,
- greater customer satisfaction,
- improved pedestrian features, and
- increased system operating efficiencies.

The BRT service would operate with frequent service which would reduce travel delays, improve transit accessibility, and enhance the land use and transportation relationship. These service improvements are expected to positively benefit transit patronage by attracting more choice riders, i.e., those that have a choice on whether to drive an automobile or use transit service but elect to take a trip on transit.

3.4.2 Changes to Transit Patronage and Demand

Based on 2012 CTA ridership data, there are over 31,000 trips taken per day on Ashland Avenue Route □9, which mirrors the proposed BRT route. Two ridership factors were estimated and evaluated using the CMAP 2010 travel demand model data and TCRP Report □118[11] to determine potential changes to transit patronage and demand resulting from the Build Alternative, as follows:

- *Daily Boardings* □ For the purposes of evaluating changes to daily boardings, total transit boardings along the corridor (local bus and BRT service) during a typical weekday were evaluated. Initial estimates of daily boardings along the Ashland Avenue corridor indicated an increase of approximately 29 percent with implementation of the Ashland Avenue BRT Project. This estimated daily boarding increase would result from increased transit capacity, speed, timing, and reliability.
- *Mode Split* □ Mode split was also evaluated and represents the percentage of trips on buses (transit) within the corridor (local bus and BRT service) under daily travel conditions during a typical weekday. CMAP 2010 data indicated an existing transit mode split of 14 percent which is estimated to increase to 26 percent as a result of implementation of the Ashland Avenue BRT Project. Estimated transit mode split increases would result from increased transit ridership and decreased roadway traffic volume capacity.

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[11] Transportation Research Board, 2007, TCRP Report 118 □Bus Rapid Transit Practitioner□s Guide.

3.4.3 Station Access and Pedestrian Space

Implementation of the Build Alternative is expected to benefit pedestrians and bicyclists by providing a new transit option that would encourage walk and bike trips. In addition, the complete streets design of the project would encourage traffic calming, creating a system that benefits all users of the transportation system. Three station access and pedestrian space factors were estimated and evaluated to determine potential impacts of the Build Alternative, as follows:

- *Pedestrian Space* Pedestrian space calculations were developed at proposed BRT station intersections along the corridor to represent net gains in sidewalk space and raised median space at station locations that could be realized by the Build Alternative. The proposed Build Alternative would expand the sidewalk width and install a median at stations, increasing pedestrian space at station intersections by 52 percent.

- *Raised Medians* Raised medians represent the linear feet of raised medians along the corridor alignment between stations. The total length of raised medians (excluding station platforms) is anticipated to increase by over 173 percent compared to existing conditions. Because raised medians would restrict pedestrian crossings at unsignalized intersections, mid-block crossings would be installed at select locations. At these locations, a break in the median would provide a crossing point and a refuge (waiting area) for pedestrians crossing Ashland Avenue.

- *Sidewalk Buffers* As part of this analysis, the amount of linear feet of sidewalk buffers (parking lane or landscaping between sidewalks and vehicle travel lanes along the corridor) was evaluated. Compared to existing conditions, a 34 percent increase to sidewalk buffers would be provided through implementation of the Build Alternative. These increases would enhance the pedestrian environment and support safe pedestrian circulation in the corridor.

3.4.4 Phased Transit Operations Plan

The first phase (Phase 1) of BRT implementation would operate between Cortland Street in the north and 31st Street in the south (5.4 miles). Construction of BRT median stations, center running bus-only lanes and TSP upgrades would first be constructed in this area. Outside of the Phase 1 area, the BRT bus service would stop curbside at the proposed BRT station locations using existing curbside bus stops until Phase 2 is constructed. Upon completion of Phase 2, operations of the BRT service in the Phase 2 areas would be similar to Phase 1, with center running BRT vehicles and center median stations. Until Phase 2 is completed, detailed interim operational plans would be developed to ensure proper integration of BRT and local bus service at the ends of the corridor outside of the Phase 1 area, so that bus idling times are not substantially increased in these areas or on adjacent streets.

4. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment and environmental consequences of the No-Build Alternative and construction and operation of the Build Alternative on the social, cultural, and natural environment. The following topics are considered: displacements, social, and neighborhood impacts; land use and economic development; environmental justice; historic and archaeological resources; parklands and recreational resources; visual and aesthetic conditions; noise; air quality; water and biological resources; geology and soils; hazardous materials; energy; safety and security; construction impacts; and indirect and cumulative impacts. Mitigation to address potential impacts is provided where determined appropriate.

The Build Alternative alignment extends approximately 16.1 miles, from Irving Park Road in the north to 95th Street in the south. While the first phase of construction is planned to extend within a smaller portion of this corridor (5.4 miles), from Cortland Street in the north to 31st Street in the south, the sections below disclose environmental impacts for the full Build Alternative. The discussions below also acknowledge the phased nature of the project where appropriate.

4.1 Displacements and Relocation of Existing Uses

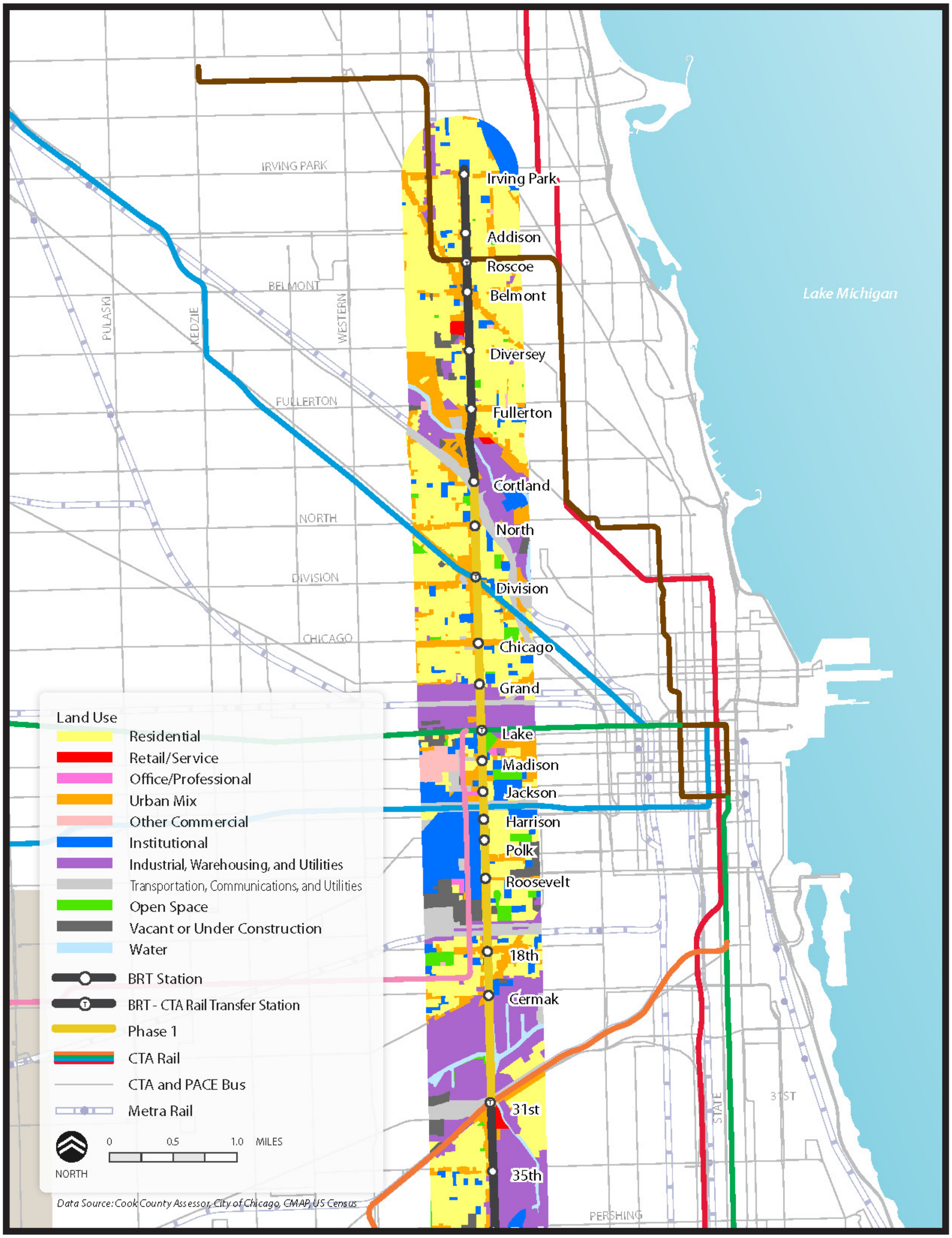
The project would be constructed within the right-of-way of Ashland Avenue, and as such land acquisition would not be necessary. However, in some Bus Rapid Transit (BRT) station locations along the corridor the existing roadway narrows. In these locations acquisition of small slivers of land may be necessary to accommodate the project facilities. No temporary or permanent displacements or relocations to homes or businesses would occur as a result of the proposed action. Should any property acquisition become necessary that would result in the displacement or relocation of businesses or individuals through project development, it would be conducted in accordance with the provisions in the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* [42 United States Code (USC) § 61, and the implementing regulation 49 Code of Federal Regulations (CFR) §24].

4.2 Land Use and Economic Development

Regional and local planning bodies govern land use and zoning regulations. Within Chicago, the Chicago Metropolitan Agency for Planning (CMAP) as the regional planning body defines the regional planning principles for the project area, while the City of Chicago regulates land use policies and zoning within their local jurisdictional boundaries. As such, existing land use, zoning, overlay districts, and relevant land use plans were evaluated within a half mile buffer of Ashland Avenue to determine compatibility with the proposed project. Full land use and zoning analysis details may be found in **Appendix E-1**.

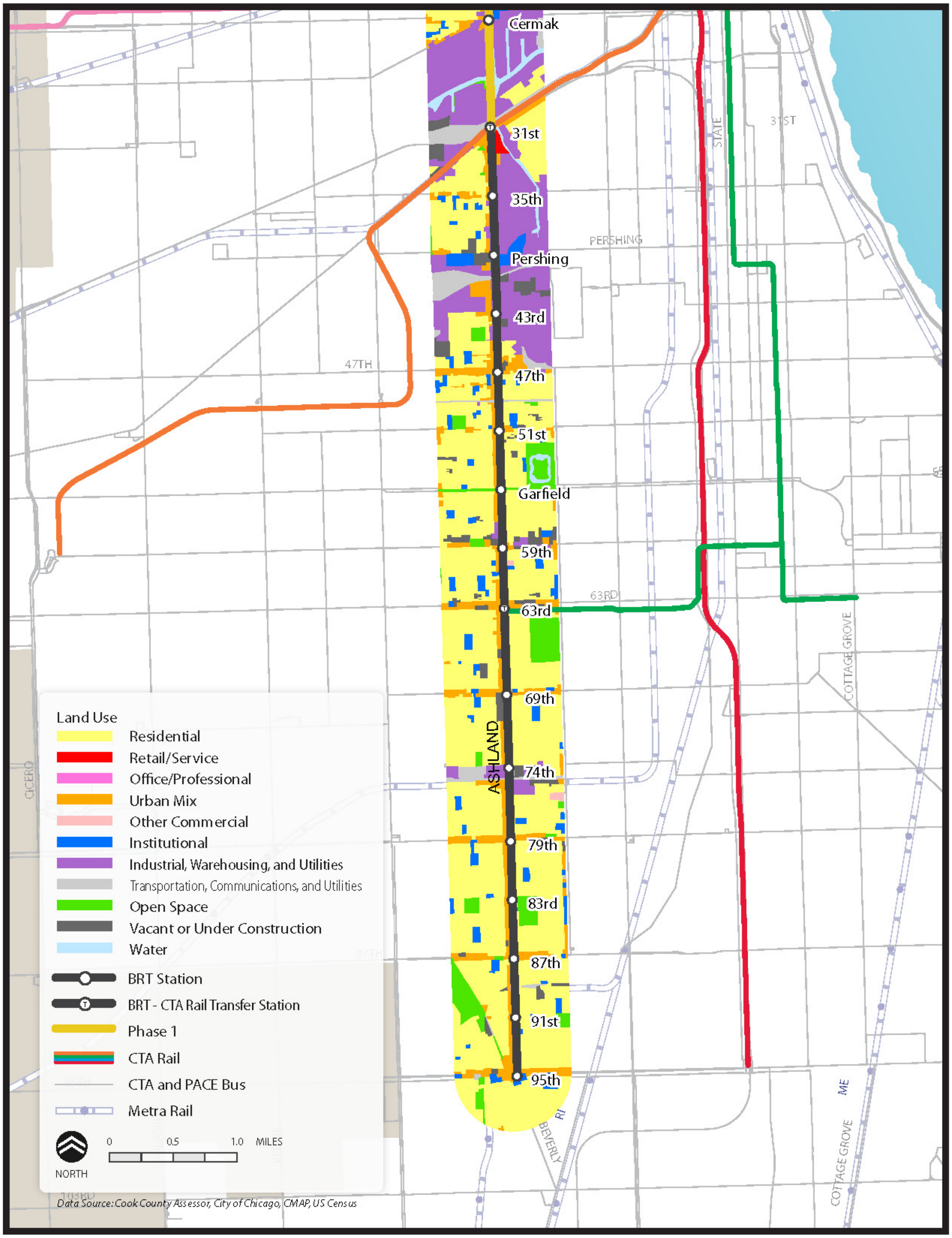
Land use within the project area is shown in **Figure 4-1** and **Figure 4-2** and is linked with the city's geography and historical pattern of urban development.

Figure 4-1: Existing Land Use (1 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 4-2: Existing Land Use (2 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Ashland Avenue is a predominantly commercial corridor with retail, business industrial, and institutional land uses lining the street. Residential uses are located throughout the area and include a mix of medium density single-family, multifamily, and mixed use development. Commercial and retail uses are located along arterial east-west streets as well as Ashland Avenue.

Institutional uses, such as schools, are located throughout the project area and are typically located within residential neighborhoods. In addition, the Illinois Medical District (IMD) is located along Ashland Avenue, between Madison Street and 15th Street. The medical district has the highest concentration of hospitals within the city, and includes medical research facilities, a biotechnology business incubator, and universities. It is a major employment and educational center along the corridor.

Two waterways flow through the project area, including the south branch of the Chicago River and the Sanitary and Ship Canal, which connects the Des Plaines River and the Chicago River. Industrial uses flank these waterways, which historically provided water transport that supported industrial activities. Similarly, industrial uses are located along the Metra commuter rail corridors that pass through the project area, including Metra's Union Pacific, Burlington-Northern Santa Fe, and Heritage Corridor lines. Some industrial uses in these areas have converted to retail and commercial uses over time.

The Ashland Avenue corridor intersects with 20 of the city's 160 Tax Increment Financing (TIF) districts. TIF is a special funding tool used by the City of Chicago to promote public and private investment across the city.[12] Within a TIF district, the amount of property tax the area generates is set at a base amount. As property values increase, all property tax growth above that amount can be used to fund redevelopment projects within the district. The majority of these TIF districts are focused on mixed use residential and commercial development and encompass most retail oriented streets along Ashland Avenue. In addition to these mixed-use focused TIF districts, there are also five industrial corridor TIF districts that are concentrated near the three major rail lines and three interstate highways that pass through the corridor. Existing access to and from interstate highways would be retained in these areas as part of the proposed project. The Ashland Avenue corridor also intersects three previously designated Empowerment Zones and two of the city's three Enterprise Communities. The Empowerment Zones/Enterprise Communities program is a federal, state, and local government partnership for stimulating comprehensive renewal – particularly economic growth and social development – in distressed urban neighborhoods across the nation.[13] Combined, these areas provide a number of tax and business incentives in the corridor that contribute to the current and planned land use and transportation environments.

The city also has a number of Community Plans and Open Space Plans that were reviewed for relevance to the project area. Relevant, recently completed land use plans to the project area include the *Chicago River Corridor Development Plan*, *Reconnecting Neighborhoods Plan*, and the *Near Northwest Side Plan*. These plans provide a future vision for specific portions of the corridor and summaries of the contents of these reviewed plans are provided in **Appendix E-1**. In addition to existing plans, in May 2013, the Chicago City Council approved a *BRT Land Use*

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[12] City of Chicago, Tax Increment Financing Program, http://www.cityofchicago.org/city/en/depts/dcd/supp_info/tax_increment_financingprogram.html.

[13] U.S. Department of Housing and Urban Development, Community Renewal Initiative, http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/economicdevelopment/programs/rc

Development Plan that is proposed specifically to analyze and identify improvements to local land use policies to support the eventual development of BRT along Ashland Avenue.

Environmental Impacts

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed and no impacts to current land use or zoning would occur. The No-Build Alternative would not further incentivize economic development in the corridor and would have no impact on existing land uses.

Build Alternative

Relevant and recently completed community, open space, and land use plans were reviewed for consistency with the project. A summary of these plans is provided in **Appendix E-1**. These plans share common goals with the Build Alternative □namely, to improve connections to open space (including the Chicago River), enhancing pedestrian access, urban design, and economic development, and improving transit connectivity and bus stop or station amenities for passengers. The Build Alternative is consistent with and supportive of plans along the corridor.

The Build Alternative is also consistent with existing land use and zoning, and would have no adverse impacts on land uses in the corridor. Ashland Avenue is an urban corridor with predominantly mixed-use commercial and residential uses along with retail, business industrial and institutional land uses lining the street. The Ashland Avenue BRT Project is anticipated to strengthen the land use and transportation connection. In addition, the City of Chicago has recently begun a land use study to identify further improvements to land use policies in the corridor to support development of the Build Alternative. Finally, the implementation of BRT would further support economic development plans by providing greater cohesion between land use and transportation. The BRT service and street enhancements could incentivize new transit-oriented development (TOD) in the corridor, which would be consistent with current zoning.

4.3 Neighborhoods and Communities

This section describes the socioeconomic characteristics that define the project area and documents potential impacts to neighborhoods and communities. For this analysis, a demographic profile representing total populations within a half mile buffer around the corridor was obtained. Demographic estimates were developed based on data from three primary sources: 2010 Decennial Census (Summary File 1), 2010 American Community Survey (Five-Year Summary), and CMAP 2009 Travel Demand Model traffic analysis zone (TAZ) data for future (2040) demographic estimates. A summary of this demographic data within the project area is shown on **Table 4-1.** Additional detailed data and maps related to the demographics analysis, including comparisons of the corridor to city-wide demographics may also be found in **Appendix E-2**.

There are currently over 232,000 people and over 90,000 households located within a half mile of the Ashland Avenue corridor, equating to approximately nine percent of the population of the city as a whole. Approximately one in four households within walking distance to the Ashland Avenue corridor does not have access to a vehicle and relies upon transit for their travel needs. While the racial composition of the corridor is predominantly minority (55.7 percent), minority densities in the corridor (11.8 people per acre) are somewhat lower than for the city as a whole

(12.4 people per acre). Limited English proficiency (LEP) residents along the corridor make up approximately three percent of the population and are similar to city-wide averages. Low-income family densities (0.8 people per acre) are also similar to city-wide low-income densities (0.7 people per acre).

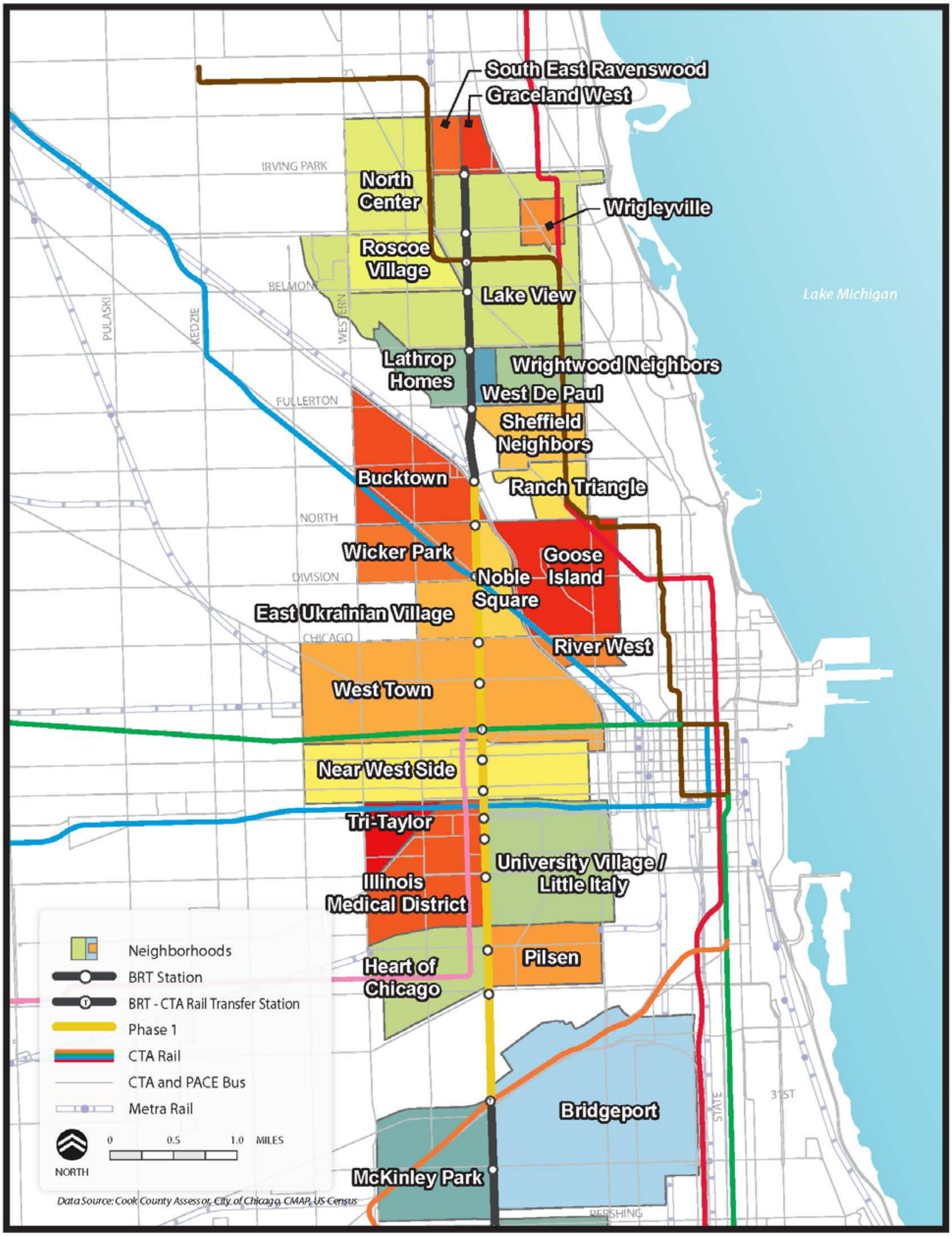
Table 4-1: Ashland Avenue Demographic Profile Summary

Demographic Factor	Universe	No-Build	Percent of Total Universe	Density (# per Acre)
2010 Population	Population	232,051	--	21.5
2040 Population	Population	286,779	--	26.5
2010 Households	Households	90,781	--	8.4
2040 Households	Households	108,405	--	10.0
2010 Minority	Population	127,550	55□	11.8
2010 Low-Income Families	Families	9,031	4□	0.8
2010 Youth	Population	21,518	9□	2.0
2010 Senior	Population	28,031	12□	2.6
2010 Limited English Proficiency	Households	6,894	3□	0.6
2010 No Vehicles Available	Households	22,538	10□	2.1

The Ashland Avenue corridor intersects 33 of Chicago's 228 designated neighborhoods, as shown in **Figure 4-3** and **Figure 4-4** Neighborhoods intersecting the corridor include the following:

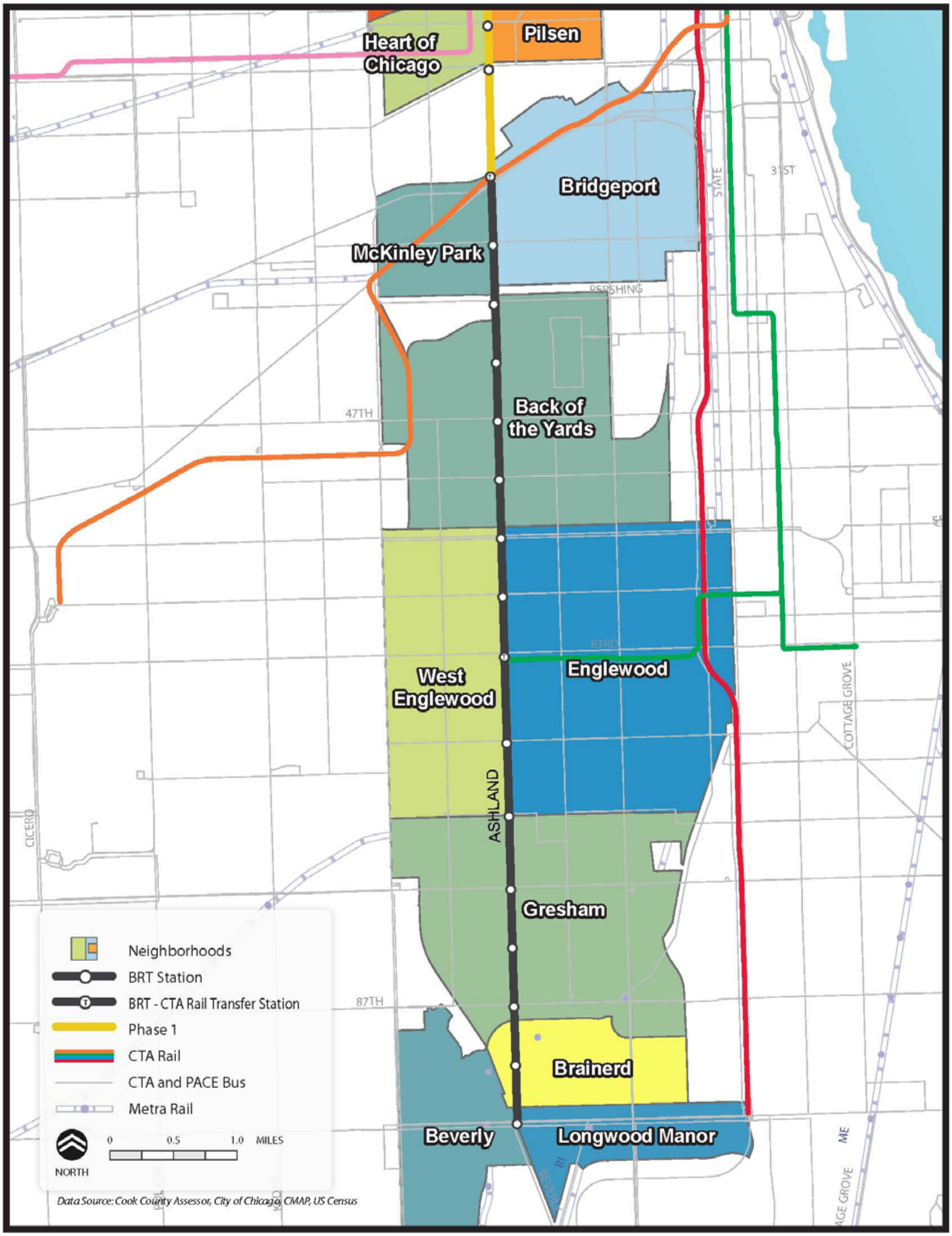
- Beverly
- Longwood Manor
- McKinley Park
- West De Paul
- Near West Side
- Noble Square
- Tri-Taylor
- Wrigleyville
- Goose Island
- Graceland West
- Brainerd
- Ranch Triangle
- Bucktown
- Illinois Medical District
- West Englewood
- Gresham
- South East Ravenswood
- Lake View
- Bridgeport
- River West
- Heart of Chicago
- Pilsen
- Lathrop Homes
- University Village □Little Italy
- East Ukrainian Village
- North Center
- Roscoe Village
- Englewood
- Back of the Yards
- West Town
- Wicker Park
- Wrightwood Neighbors
- Sheffield Neighbors

Figure 4-3: Intersecting Neighborhoods (1 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Figure 4-4: Intersecting Neighborhoods (2 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

The corridor also intersects 20 of Chicago's 50 Aldermanic Wards. These 50 aldermen make up the City of Chicago's Council, who with the Mayor of Chicago, are charged with governing the city and representing communities within their ward. The following wards intersect the corridor:

- Ward 1
- Ward 2
- Ward 3
- Ward 11
- Ward 12
- Ward 15
- Ward 16
- Ward 17
- Ward 18
- Ward 19
- Ward 20
- Ward 21
- Ward 25
- Ward 26
- Ward 27
- Ward 32
- Ward 43
- Ward 44
- Ward 46
- Ward 47

There are also several community facilities located along Ashland Avenue. Three community facilities are located within 250 feet of a proposed BRT station. These include Lake View High School (4015 North Ashland Avenue) near the proposed Irving Park Road station, Burr Elementary School (1310 North Ashland Avenue) near the proposed North Avenue station, and Rush University Medical Center (1653 West Congress Avenue) near the proposed Harrison Street station. It is anticipated that these communities would benefit from increased transit access and enhanced pedestrian space at station intersections, and these community facilities would be considered in development of station design.

Police and fire stations located near the corridor were also identified. The 7th Precinct Police Station is located within a quarter mile of the corridor at 1400 West 63rd Street. There are also seven fire stations located within a quarter mile of the corridor, four of which are located directly on Ashland Avenue and one is near the intersection of Ashland Avenue and 33rd Street.

Environmental Impacts

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed and no impacts to neighborhoods or communities would occur.

Build Alternative

The proposed improvements would not divide any neighborhoods or otherwise adversely affect community cohesion. BRT facilities would be designed and sited to complement the existing character of the project area neighborhoods. This would include station signage to important points of interest at specific BRT station locations, and decorative artwork consistent with community character. Inclusion of these features would be determined during final design with input from community stakeholders and neighborhood elected officials (i.e., aldermen). In addition, the Chicago Transit Authority (CTA) and the Chicago Department of Transportation (CDOT) have both established design guidelines that would be incorporated into final design. CDOT's *Complete Streets Chicago Design Guidelines*[14] and CTA's *Transit Friendly Design Guide*[15] would be used to ensure that the design of stations and crossing fit the form and function of adjacent land uses and roadway typologies within the corridor. Mid-block crossings would be provided at specific locations along the corridor to ensure safe pedestrian crossings between signalized intersections. Changes to the physical layout within the existing right-of-way would improve the quality of pedestrian access and transit service along and throughout the corridor, thereby enhancing community cohesion. Improvements at intersections would also help reduce the dividing effect between neighborhoods that Ashland Avenue currently has in some areas. Project designs would be sensitive to emergency access needs in the corridor. During operation, emergency vehicles would continue to have the right-of-way in emergency situations, and buses as well as other traffic would yield to emergency vehicles in these situations. Continued coordination with emergency service providers through final design would help to ensure that the project does not create any impediments to emergency access.

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[14] Chicago Department of Transportation, Complete Streets Chicago Design Guidelines, 2013.
http://www.cityofchicago.org/content/dam/city/depts/cdot/Complete%20Streets/CompleteStreetsGuidelines.pdf

[15] Chicago Transit Authority, Transit-Friendly Development Guide: Station Area Typology, 2009.
http://www.cityofchicago.org/dam/city/depts/zlup/Planning_and_Policy/Publications/Transit_Friendly_Development_Guide/CTA_Typology_Study.pdf

4.4 Historical and Archaeological Resources

The National Environmental Policy Act of 1969 (NEPA), under 40 CFR 1500-1508, requires that all projects receiving federal funding take into account effects on historic and cultural resources, and identify all adverse and beneficial effects of a project on these resources. Cultural and historic resources are protected by various federal regulations; most notably Section 106 of the National Historic Preservation Act (NHPA) which requires federal agencies to consider impacts to historic resources from their actions and to balance preservation needs with the need for the action. The Section 106 process "seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation… ". The goal of the consultation is to identify historic properties potentially affected by the undertaking, assess project effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties (36 CFR 800.1.a). The Section 106 consultation was conducted for this project; an Eligibility and Effects Meeting was held with the State Historic Preservation Officer (SHPO) of the Illinois Historic Preservation Agency (IHPA) and other consulting parties on July 15, 2013 and is discussed in further detail in the environmental impacts discussion contained within this section.

In addition to the Section 106 requirements, Section 4(f) of the Department of Transportation Act of 1966 protects publicly or privately owned historic sites listed or eligible for listing on the National Register of Historic Places (NRHP). Where projects involve the use, including temporary or constructive use, of land from a historic site or district, additional consultation with the SHPO is required to determine whether a programmatic and/or individual Section 4(f) Evaluation is required. Further details on the evaluation of Section 4(f) resources and determination of use are provided in **Section 4.5**.

For the assessment of historic and archaeological resources, the Federal Transit Administration (FTA) determined an Area of Potential Effect (APE) for cultural/historic resources along the Ashland Avenue corridor. Figures depicting the architectural and archaeological APE are included in **Appendix E-3**. The APE takes into account the location of proposed BRT stations as well as the potential for other effects (e.g., visual changes) that could impact historic resources. The APE is confined to the right-of-way in the areas between the station locations because the project activities (including milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements) would not result in any potential adverse proximity effects to the location, design, setting, materials, workmanship, feeling, or association of nearby historic resources. Around station areas, the APE was expanded on a station by station basis to account for the character of the built environment at each location. In other words, the APE was expanded to consider the size and type of buildings surrounding each station, and how each station could potentially affect the existing visual, auditory, or vibrational environment. Figures indicating the APE around the stations are included in **Appendix E-3** for further reference.

To identify historic architectural resources in the APE, the Historic Architectural Resources Geographic Information System (HARGIS), the NRHP database, and city records — including the Chicago Landmarks List and the Chicago Historic Resources Survey (CHRS) — were reviewed. Using this information, a list of NRHP listed and previously determined eligible properties within the APE was compiled. This effort included the identification of known archaeological sites, NRHP listed districts and structures, CHRS properties rated Orange or Red, locally listed historic landmarks, and any additional properties previously identified as eligible for the NRHP.

Consistent with the regulations (36 CFR 800.4.b.1), the project team has considered past planning, research, and studies, the magnitude and nature of the undertaking, the nature and extent of potential effects on historic properties and the likely nature and location of historic properties within the APE in its identification efforts.

Portions of five NRHP listed historic districts fall within or adjacent to the APE including the East Ravenswood Historic District, West Jackson Boulevard Historic District, Pilsen Historic District, Chicago Sanitary and Ship Canal Historic District, and Chicago Park Boulevard System Historic District. Details on these historic districts and locations are provided in **Appendix E-3**.

Following the archival research, the project team's architectural historian completed a windshield survey of the Ashland Avenue corridor APE, noting buildings within the APE that exhibit distinguishing architectural features associated with historic styles. During a March 2013 field visit, 72 individual structures within the APE were photographed and assessed to determine their eligibility for listing on the NRHP. In total, 25 individual properties are NRHP listed or recommended eligible. Further information on these properties is included in **Appendix E-3**.

Archaeological resources and properties were also identified in the field as potentially NRHP eligible for each station location. Two previously recorded archaeological sites were identified along the Ashland Avenue corridor. Site 11-Ck-350 is a historic site that contains the remaining endpoint of the Illinois and Michigan Canal. Site 11-Ck-781 is the Central Manufacturing District. It is part of the first American Industrial Park, established in 1905.

Environmental Impacts

No-Build Alternative

There would be no impacts to historic or archaeological resources under the No-Build Alternative.

Build Alternative

Effects of the Build Alternative are discussed here and are subject to final determination by FTA as part of the Section 106 process. The Build Alternative alignment and stations are anticipated to be located within existing right-of-way. The preferred configuration for station locations is in the median near signalized intersections along the corridor; however, exact placements of stations were still in development during the analysis of historic and archaeological resources in this Environmental Assessment (EA). As such, the assessment of environmental impacts considered all potential locations for near-side and far-side median stations as well as curbside stations. Detailed information and pictures related to this assessment are contained in *Cultural Resources Technical Memorandum* in **Appendix E-3**.

An Eligibility and Effects Meeting was held with the SHPO and interested consulting parties on July 15, 2013 as part of the Section 106 process, where the findings of this cultural resources technical analysis were presented. SHPO and consulting parties in the Section 106 process also provided their comments on this project. These consulting parties included the following: the Chicago Art Deco Society, the City of Chicago Department of Housing and Economic Development (DHED) - Historic Preservation Division, the Forest County Potawatomi Community, Greater Southwest Development Corporation, Ho-Chunk Nation, Landmarks Illinois, the Ridge Historical Society, and West Lakeview Neighbors. Letters of response to SHPO and these organizations are also provided in **Appendix F-1**.

As a result of the Eligibility and Effects meeting, responses to comments and subsequent coordination the SHPO has issued their concurrence with the No Adverse Effect finding for the project (see **Appendix F-1**). The conditions of SHPO□s concurrence are as follows: (1) all stations and shelters located within historic districts be located in the center median and (2) the proposed stations and shelters located adjacent to properties listed or deemed eligible for the NRHP be placed in the median or the opposite side of the street. CTA is committed to continue coordination with the SHPO through final design as part of this project.

Archaeological Resources

The eastern edge of archaeological site 11-Ck-781 falls within the project's APE at the southwestern quadrant at the intersection of Pershing Road and Ashland Avenue where a BRT station is proposed. A modern building is currently located at this intersection within the boundaries of site 11-Ck-781. The BRT station planned for this location would be a center median station and no impacts to this archaeological site are anticipated. No other archaeological resource impacts are expected as a result of this project.

Historical Resources

Due to Section 106 of the NHPA requirements, FTA must consider both the direct and indirect impacts upon historic resources from this project. The following provides a detailed assessment of direct and indirect effects of the Build Alternative.

Direct Effects

Based on the preliminary assessment, no adverse effects are anticipated from construction of BRT stations within the five historic districts that fall within or adjacent to the project APE. This was confirmed with the SHPO through the Eligibility and Effects meeting held on July 15, 2013. Stations would be located in the median of Ashland Avenue, and would be designed to fit the historic context of these areas, with modern, glass enclosures.

For the 25 NRHP-listed or potentially eligible structures identified in the APE, potential BRT station placement options were reviewed to identify any potential adverse effects, and are detailed in **Appendix E-3**. Based on the assessment, no adverse effects are anticipated from construction of stations near these structures. This has been confirmed with the SHPO through the Section 106 process. Stations would be located in the median of Ashland Avenue, and would be designed to fit the historic context of these areas, with modern, glass enclosures.

Indirect Effects

The project team also evaluated the potential for visual impacts that could result in indirect impacts to historical resources.

The potential for visual impacts to historic structures is limited since this is an existing transportation corridor and the proposed action is not expected to disturb or alter any of the characteristics that qualify the identified buildings as being historic. Seventeen station locations are proposed within or near the NRHP boundaries of individual historic properties or within the parcels of contributing properties within historic districts. Potential project impacts are limited to changes to historic properties' visual settings. The BRT stations would be located in a manner to avoid visual impacts to historic properties. Although some of the proposed stations are located within the view sheds of historic properties identified, no station structures would be located where they would obstruct or obscure any historically significant views to or from any historic properties. Changes to historic property settings as a result of the project would be minor and not adverse. Therefore, no adverse effects are anticipated from visual impacts to historic properties.

4.5 Parklands and Recreational Resources

The project study area was examined to determine the location of public parks and recreational areas along the proposed BRT corridor. Seven public parks are located adjacent to the Ashland Avenue corridor (see **Table 4-2 and Figures 4-5** and **4-6**), which provide residents and visitors access to passive and active recreation activities.

Table 4-2: Parks Adjacent to Ashland Avenue Corridor

Park	Location	Acres
Wrightwood Park	2534 North Greenview Avenue	4.3
Walsh Playground Park	1722 North Ashland Avenue	1.9
Polonia Triangle Park	Ashland Avenue and Milwaukee Avenue	0.1
Union Park	1501 West Randolph Street	13.8
Canal Origins Park/Park No. 516	2701 South Ashland Avenue	2.7
Mulberry Playlot Park	3150 South Robinson Court	0.6
Linear Greenspace	Ashland Avenue and Garfield Boulevard	1.1

Environmental Impacts

No-Build Alternative

Parklands would not be impacted under the No-Build Alternative as no construction would occur.

Figure 4-5: Parklands (1 of 2)

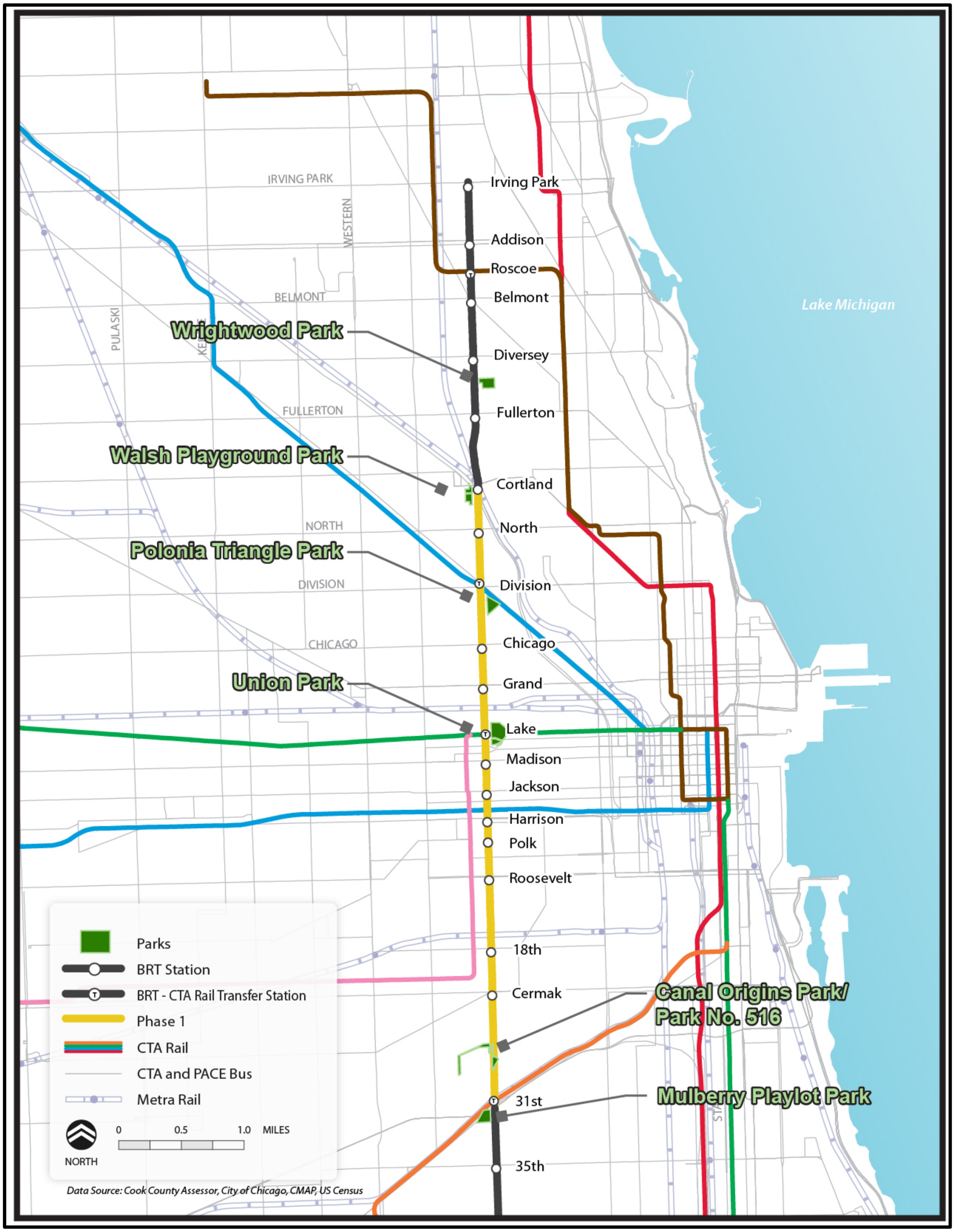
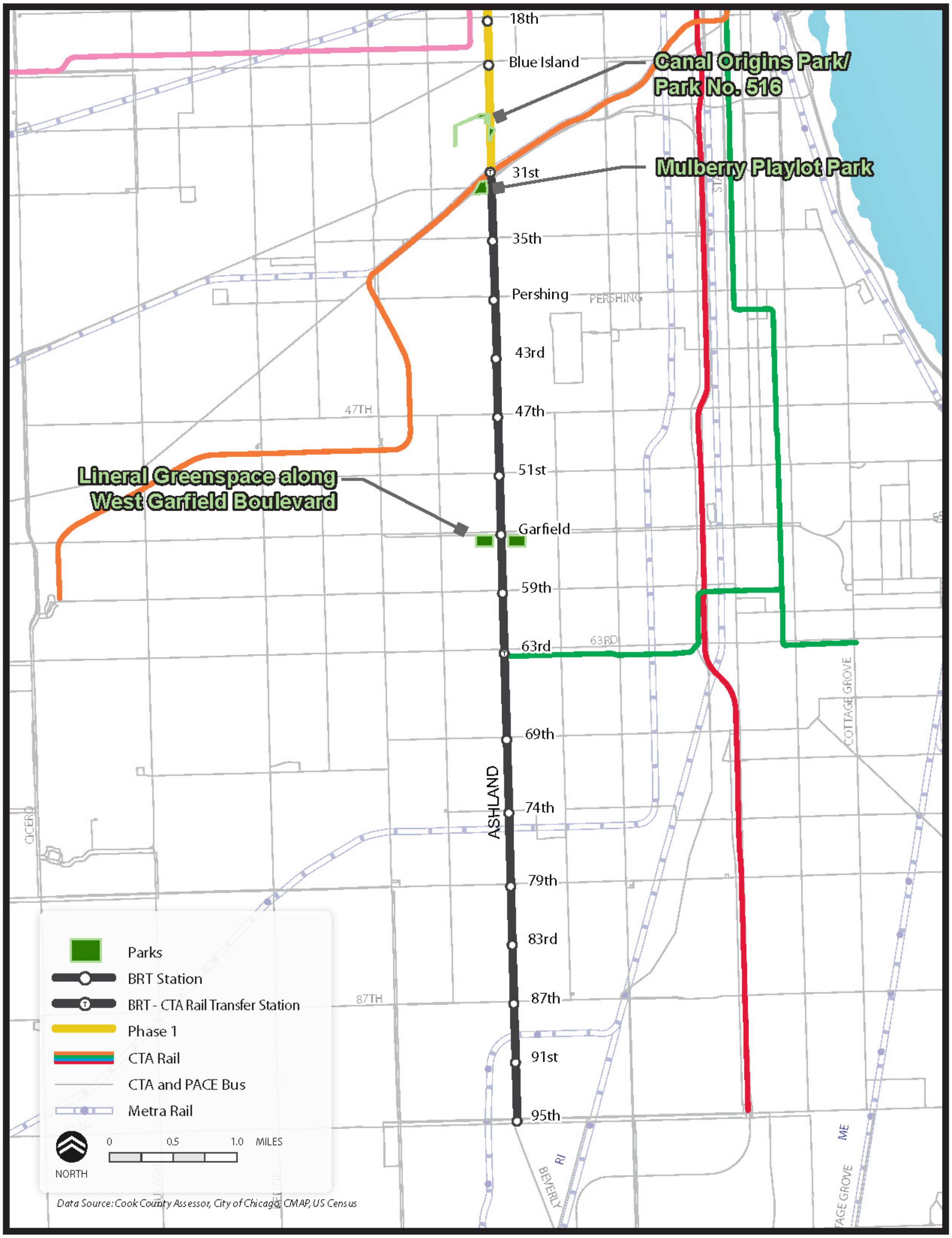


Figure 4-6: Parklands (2 of 2)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Build Alternative

None of the parks located adjacent to the Ashland Avenue corridor would be impacted by the proposed BRT project. BRT stations are planned to be constructed within the existing right-of-way of Ashland Avenue from Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles) where practical and feasible. Only one of the 35 proposed station locations is in the immediate vicinity of a park: Union Park at the Ashland Avenue–Lake Street intersection. The proposed station location would not encroach on the park boundary and would increase transit access to the park; therefore, no impacts to this park are anticipated.

Section 4(f) of the Department of Transportation Act of 1966 (Section 4(f)) generally does not allow federally funded transportation projects to use land from publicly owned parks if there is a prudent and feasible avoidance alternative. Section 4(f) also requires that all possible planning be implemented to minimize harm to Section 4(f) resources. Since the construction and operation of the BRT station at the Ashland Avenue–Lake Street intersection is not anticipated to result in any permanent use, proximity effects, or temporary adverse effects to public parkland and recreation areas, no Section 4(f) impacts are anticipated, and no further Section 4(f) analysis is required.

4.6 Visual Quality

The entire length of the Ashland Avenue corridor is primarily commercial in nature as it is a major north-south corridor within the city. Each of the 35 intersections where stations are proposed contains a combination of commercial, educational, mixed-use, industrial, and multi-family residential buildings. As an urbanized corridor, buildings along Ashland Avenue have undergone continuous changes and re-use along with modern buildings being constructed at many of the intersections. Several vacant lots occur at various intersections and along the Ashland Avenue corridor.

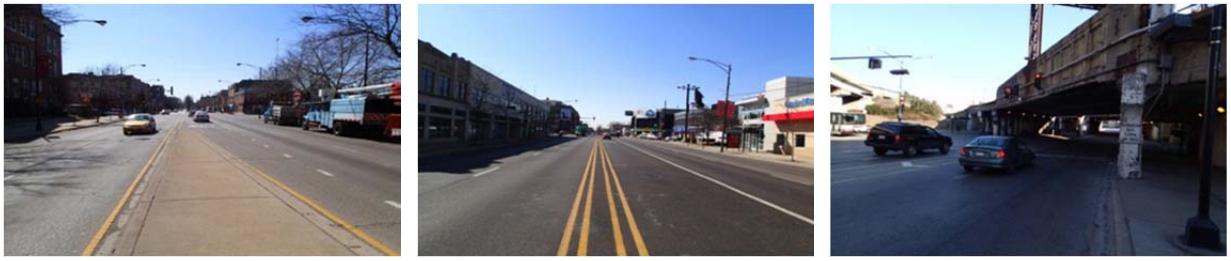
Transportation infrastructure within the existing roadway right-of-way includes roads, bus stops, traffic signals, and signage, and is already a major part of the visual landscape of this highly urbanized area. **Figure 4-7** illustrates the current visual conditions of several of these intersections and **Figure 4-8** shows the proposed design concepts for the Build Alternative for purposes of comparison.

Environmental Impacts and Mitigation

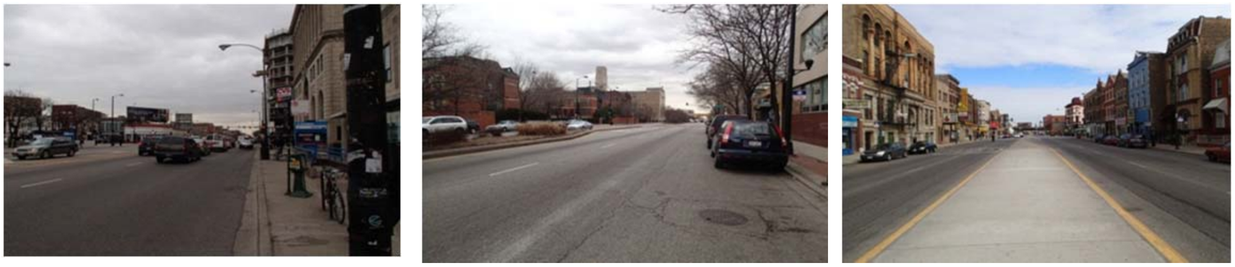
No-Build Alternative

There would be no impacts to the visual or aesthetic quality of the project area under the No-Build Alternative.

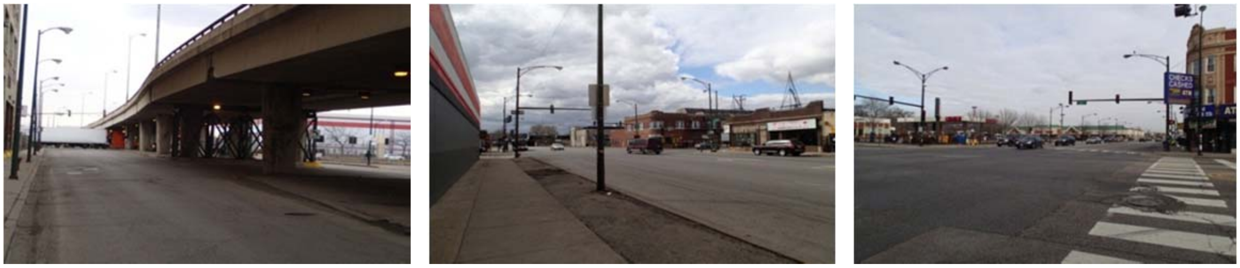
Figure 4-7: Current Visual Conditions at Select Intersections along Ashland Avenue



Irving Park Road Belmont Avenue Cortland Street

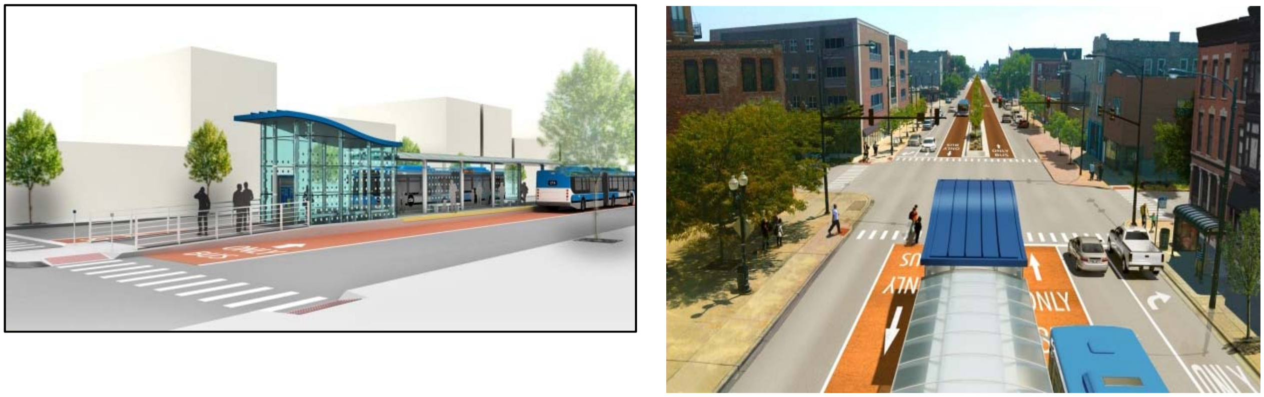


Division Street Jackson Boulevard 18th Street



Pershing Road 74th Street 95th Street

Figure 4-8: Build Alternative Station and Alignment Concepts



Build Alternative

No adverse effects to visually sensitive resources are anticipated as a result of the Ashland Avenue BRT Project. Implementation of the BRT project would result in two primary improvement types: construction of BRT stations at key intersections, and additional improvements within the corridor right-of-way.

BRT stations are proposed at 35 key intersections along the corridor. No impacts are anticipated from implementation of BRT median stations since they would fit within the aesthetic character of their surroundings □a medium density commercial area with scattered high density residential development along Ashland Avenue. Bus service currently operates along Ashland Avenue and the majority of the proposed features for the Ashland Avenue BRT Project are already present along the corridor (i.e., shelters, benches, signage, trash cans, etc.).

Furthermore, BRT station designs would be sensitive to the local character of the area and not detract from the context of surrounding architecture. As part of the station design process, an extensive public involvement□design charette effort is being pursued to obtain station design input as well as to assure the appropriate mitigation options are determined that would minimize and avoid any potential visual impacts to historic resources and the visual setting along the Ashland Avenue corridor. New BRT station materials, colors, and detailing are intended to be aesthetically pleasing and complementary with surroundings. The final design of the shelters is anticipated to be consistent with the context of the surrounding community. Overall, the shelters are not expected to change the aesthetic character along Ashland Avenue.

Proposed improvements along the road corridor itself would involve milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements, and would be confined to the existing right-of-way. As such, no adverse visual impacts are anticipated. In addition, no potential adverse proximity or visual effects to the location, design, setting, materials, workmanship, feeling, or association of nearby historic resources in the areas between the proposed stations are anticipated. The visual quality of the surrounding environment is expected to benefit from the Build Alternative.

In summary, the overall changes in the visual setting as the result of the Build Alternative, including improvements at station locations, striping of designated BRT lanes, and streetscape improvements (including medians, landscaping, and Americans with Disabilities Act of 1990 [ADA]-accessibility upgrades) would be beneficial to residents, businesses, and the pedestrian environment.

4.7 Noise and Vibration

Noise is "unwanted sound" and, by this definition, the perception of noise is a subjective process. Several factors affect the actual level and quality of noise as perceived by the human ear and can generally be described in terms of loudness, pitch (or frequency), and time variation.

The loudness, or magnitude, of noise determines its intensity and is measured in decibels (dB). The A-weighted decibel (dBA) is commonly used to describe the overall noise level from transit sources because it is an attempt to take into account the human ear's response to audible frequencies. Because the decibel is based on a logarithmic scale, a 10-decibel increase in noise level is generally perceived as a doubling of loudness, while a three-decibel increase in noise is just barely perceptible to the human ear.

The *FTA Transit Noise and Vibration Impact Assessment Manual* has three levels of analysis that may be used to evaluate noise impacts of a transit project, depending on the type and scale of the project, the stage of project development, and the environmental setting. The three levels of analysis are:

- Screening procedure
- General assessment
- Detailed analysis

The screening procedure is used to identify noise and vibration-sensitive land uses in the vicinity of a project and whether there is likely to be an impact. The screening procedure takes into account the noise impact criteria, the type of project, and noise-sensitive land uses.

The screening procedure for a bus way was deemed most appropriate for this noise analysis. The screening procedure provides an impact distance, which is defined as the distance large enough to include all locations potentially impacted by noise from this project. This distance is measured from the center of the noise-generating activity □ in this case, the centerline of Ashland Avenue. This distance was calculated using a maximum operational BRT scenario for the proposed bus way project with a low threshold of 50 dBA as the impact criteria. Based on FTA's guidelines for screening distances, which are prescribed distances for the noise analysis based on the type of project being implemented, the screening distance for a bus way system was used in this analysis. Screening distances for bus way systems are 500 feet (for unobstructed areas) and 250 feet (for areas where there are intervening buildings).

In order to analyze and compare specific categories of noise impacts associated with the Build Alternative, two noise assessment buffers at 500 feet and 250 feet from the center of the bus way facility (in this case, the centerline of Ashland Avenue) were developed. Maps of the noise assessment buffers are provided in **Appendix E-4**. The existing noise environment was assumed to be 60 dBA based on the *FTA Transit Noise and Vibration Impact Assessment Manual* (*Figure 2-17*). Based on the screening analysis, residential land use categories were found to be located within the noise buffers and a general assessment was conducted to determine the noise levels at the residential land use category using the FTA's Noise Impact Assessment Spreadsheet. The average number of buses per hour was assumed to be 12 buses in each direction (24 total buses) for the daytime as well as nighttime hours traveling at 15.9 mph.

Environmental Impacts

No-Build Alternative

No noise impacts would result from the No-Build Alternative.

Build Alternative

The proposed project would be located along an existing roadway corridor, in an urban setting, and would not substantially increase the number of transit vehicles on the roadway. **Table 4-3** shows the noise levels at 50, 100, 150, and 200 feet from the proposed alignment measured from the center of the noise generating activity.

Table 4-3: Noise Level Impact Summary

Distance	Project 24-Hour Sound (Ldn)	Existing 24-Hour Sound (Ldn)	Moderate Impact Criteria	Severe Impact Criteria	Impacted?
50 ft.	59 dBA	56 dBA	58 dBA	63 dBA	Moderate Impact
100 ft.	55 dBA	52 dBA	58 dBA	63 dBA	No
150 ft.	52 dBA	49 dBA	58 dBA	63 dBA	No
200 ft.	50 dBA	47 dBA	58 dBA	63 dBA	No

Note: Ldn refers to day-night average sound level and is the primary metric for measuring noise impacts.

At 50 feet from the Ashland Avenue alignment, the increase in noise level is expected to be approximately 3 dBA and the receivers would meet the Moderate Impact Criteria of 58 dBA. The contour distance to moderate impact is 62 feet and for severe impact is 26 feet from the center of the noise generating activity. The FTA's Noise Impact Assessment Spreadsheets for each representative distance are included in **Appendix E-4**.

Based on the anticipated frequency and speed of the proposed BRT service, the proposed project is not expected to result in any severe noise impacts to the project area within the existing right-of-way. Receivers within 62 feet from the Ashland Avenue alignment measured from center of the noise generating activity would experience a moderate impact, or a 3 dBA increase. An increase of approximately 3 dBA is a barely perceptible change and is not expected to create a disruption of normal activities. Also, noise level increases are expected to be lower with the re-designation of one travel lane in each direction as a center running, dedicated bus-only lane. The overall average daily traffic volume within the Ashland Avenue corridor is expected to be reduced by 35 percent with implementation of the Build Alternative. Roadway noise is the predominant noise influence in the area, and the additional contribution from BRT traffic would be relatively minor. As indicated in **Chapter 3**, diverted traffic would be absorbed throughout the robust Chicago roadway network and no other notable increases to noise are anticipated on any one roadway within the network absorbing this traffic diversion.

In addition to noise, vibration impacts associated with rubber-tired vehicles are unlikely. The Build Alternative also includes milling and resurfacing of the existing roadway pavement, which would repair and smooth existing holes, dips, and bumps. Although the number of buses operating along the corridor would increase with the Build Alternative, by smoothing irregular portions of Ashland Avenue, there would be a reduction in vibration from roadway surface irregularities affecting existing buses along the project corridor. Therefore, no adverse vibration effects would be expected.

4.8 Air Quality

The *1970 Clean Air Act* (CAA) and *1990 Clean Air Act Amendments* require that the United States Environmental Protection Agency (EPA) set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. EPA therefore regulates ambient concentrations of seven common pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). Called criteria pollutants, various human health and environmentally-based criteria set permissible levels for these pollutants.

The Federal CAA requires states to classify air quality control regions (or portions thereof) as either attainment or non-attainment with respect to criteria air pollutants, based on whether the NAAQS have been achieved. Areas that previously exceeded the NAAQS, but have since attained the standard, are called maintenance areas. States are also required to prepare State Implementation Plans (SIPs) containing emission reduction strategies to maintain the NAAQS for those areas designated as attainment and to attain the NAAQS for those areas designated as non-attainment. Based on the findings of this analysis, Cook County, or portions thereof, is designated as a non-attainment area for O_3, $PM_{2.5}$, and Pb and as a maintenance area for PM_{10}. In non-attainment and maintenance areas, transportation conformity with the SIP must be substantiated. If a potential project is included in a conforming transportation plan[16] and Transportation Improvement Program (TIP), then the project is already included in the emission budgets developed and approved for the region and determined to be in conformance with the SIP. Thus, a unique, regional analysis of project emissions would not be required.

The Ashland Avenue BRT Project is pending inclusion in the fiscal year 2010 to 2015 TIP. The Metropolitan Planning Organization (MPO) Policy Committee of CMAP for the region is responsible for endorsing the TIP. Projects in the TIP are considered to be consistent with *GO TO 2040*, the 2040 regional transportation plan. While this project is currently not included in the TIP, CTA is currently working with CMAP to include the project within the TIP in the future. For the purposes of this analysis, it is assumed that the current TIP would be modified to include this project and would be in compliance with air emissions budgets. It is necessary, however, to complete an analysis for localized impacts of CO, PM_{10}, and $PM_{2.5}$. As listed in 40 CFR 93 Subpart A, project-level conformity occurs when the following three conditions are met:

- The Federal Highway Administration (FHWA)/FTA project must not cause or contribute to any new localized CO, PM_{10}, and/or $PM_{2.5}$ violations
- The project must not increase the frequency or severity of any existing CO, PM_{10}, and/or $PM_{2.5}$ violations in non-attainment or maintenance areas
- The project must comply with any PM_{10} and $PM_{2.5}$ control measures in the applicable implementation plan

CO Hot Spot Analysis

Although Cook County is not a non-attainment or maintenance area for CO, a CO hot spot analysis was still completed to evaluate possible localized impacts as part of the NEPA analysis. Because of the LOS of the affected intersections (LOS D, E, or F) and the proposed modifications to the traffic lanes, it was necessary to evaluate if the proposed action could cause adverse effects to air quality. Additional details on the CO hot spot analysis process and findings are included in **Appendix E-5** and are summarized herein.

To determine if a CO hot spot (high localized ambient concentration) is created due to activities of the proposed project, an analysis must be conducted to predict ambient CO concentrations from the near-field dispersion of the emissions. The analysis was completed using EPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (1992). The guidelines provide a ranking and selection procedure to determine the intersections expected to have the highest CO concentration. The procedures require a CO hot spot analysis be completed for the top three intersections based on the worst LOS and the top three intersections based on the highest traffic volumes. This process was used for both the AM and PM peak hour for the Build Alternative and duplicate intersections were removed. As a result, the following five intersections along Ashland Avenue were used in the analysis: (1) West Belmont Avenue □ North Lincoln Avenue, (2) West Cermak Road, (3) West Diversey Parkway, (4) West Irving Park Road, and (5) West Roosevelt Road.

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[16] A transportation plan is defined as the "official intermodal metropolitan transportation plan that is developed through the metropolitan planning process for the metropolitan planning area, developed pursuant to 23 CFR part 450" (40 CFR 93.101).

The first step in an air dispersion analysis is the selection of an applicable model. EPA's *Guideline on Air Quality Models* and EPA's 1992 CO Hot Spot Guidelines recommend the use of CAL3QHC as the screening model for such analyses. CAL3QHC combines CALINE3 with a traffic model to calculate delays and queues that occur at signalized intersections.

CO emission factors were estimated using EPA's Motor Vehicle Emission Simulator (MOVES), Version 2010b. Emission factors were developed in accordance with EPA's *Using MOVES in Project-Level Carbon Monoxide Analyses* guidance document. The Illinois Environmental Protection Agency (IEPA) provided data for input into MOVES2010b, including fuel supply and formulation, inspection and maintenance information, and vehicle age distribution files. The average January temperature for 2015 from IEPA's data files was used as the input for meteorology.

Regional emissions were calculated from projected Vehicle Miles Traveled (VMT) for each of the project alternatives. Regional daily VMT data were developed for the CMAP planning area for both the No-Build and Build Alternatives. The vehicle fleet mix was determined from the Highway Performance Monitoring System (HPMS) data provided by IEPA with its MOVES2010b input files. The EPA's annual average weekday VMT calculator was used to convert the daily VMT data to annual VMT (see **Appendix E-5** for further details).

This analysis used the current EPA-approved version of MOVES2010b (as revised January 2013) to develop emission factors for different vehicle classes. All vehicle types (motorcycles, passenger cars, passenger trucks, buses, and other trucks) contained in the IEPA's input data files were used to define the vehicle fleet mix (i.e., relative ratio of each vehicle type to total population). There would be no change to intercity buses and school buses between alternatives. It was assumed that all transit buses would be diesel-fueled.

$PM_{2.5}$ Hot Spot Analysis

Based on the assessment of the operational elements of the Build Alternative, it was determined that a $PM_{2.5}$ hot spot analysis would not be required. It is estimated that a peak of 10 local buses per hour would operate under the No-Build Alternative. The local bus frequency would be based on demand following implementation of the BRT service. The Build Alternative would add up to an additional 24 buses per hour (12 per hour in each direction). While this would be a 50 percent increase in bus traffic, the overall number of total buses required is still relatively small. All buses would operate with clean diesel technology (i.e., diesel particulate filters), resulting in a decrease in regional $PM_{2.5}$ emissions compared with the No-Build Alternative. CTA has coordinated with CMAP as part of the interagency consultation process to confirm that this project is not a project of air quality concern and that a $PM_{2.5}$ analysis is not required. Results of that coordination process are included in **Appendix F-2**.

Environmental Impacts

No-Build Alternative

The No-Build Alternative would not create new emissions or have negative operational air quality impacts. However, the No-Build Alternative would also not reduce regional VMT-related emissions like the Build Alternative.

Build Alternative

The Build Alternative would provide an alternative to automobile transportation in the region. Regional traffic emissions were evaluated as part of this analysis to assess how the proposed project would increase or decrease operational emissions from passenger vehicles. The findings of this analysis are included in Table 6 of **Appendix E-5** and indicate that emissions from regional traffic would decrease compared to the No-Build Alternative, and transit bus emissions would increase. The net effect would be a decrease in emissions for all pollutants. The Build Alternative would therefore have beneficial effects to air quality.

Based on the results of the CO hot spot analysis, the operation of the BRT service would increase the one-hour and eight-hour CO concentrations compared to the No-Build Alternative. While concentrations would increase, the NAAQS would not be exceeded. As a result, there would be no adverse air quality effects associated with the Build Alternative.

4.9 Water Resources

This section describes the existing water resources within the project corridor and at BRT station locations. The potential impacts to these resources were determined based on acreage or linear feet of impact to water resources. Readily available data on these resources was used for the analysis.

4.9.1 Surface Water

Lake Michigan is the dominant topographic feature in the region. The project would be located within the Chicago–Calumet watershed. The project corridor would cross two rivers: the North Branch of the Chicago River, just north of Webster Avenue, and the Chicago Sanitary and Ship Canal (CSSC), just north of the Stevenson Expressway. The North Branch of the Chicago River and the Chicago Sanitary and Ship Canal are regulated under the Illinois Administrative Code's Secondary Contact and Indigenous Aquatic Life Standards (35 I. Adm. Code 302, Subpart D). Water bodies regulated under this standard are suited for secondary contact uses and are capable of supporting indigenous aquatic life. The North Branch of the Chicago River is on Illinois' 303(d) list of impaired waterways; it is listed as impaired for mercury, polychlorinated biphenyls, aldrin, chloride, DDT, hexachlorobenzene, dissolved oxygen, total phosphorus, total suspended solids, fecal coliform, iron, and oil and grease. A Total Maximum Daily Load (TMDL) analysis for the North Branch of the Chicago River is ongoing for fecal coliform. The CSSC is on Illinois' 303(d) list of impaired waterways; it is listed as impaired for polychlorinated biphenyls, iron, oil and grease, dissolved oxygen, total phosphorous, mercury, and un-ionized ammonia. A TMDL analysis for the CSSC has not been developed.

The North Branch of the Chicago River and the CSSC also lie within the Inland Waterway Coastal Zone boundary. The inland waterway corridor consists of both the waterway and designated land area on either side of the waterway, and meets the requirements of federal regulations and guidelines for the inclusion within the coastal zone of rivers (waterways), on which uses may have direct impacts on coastal waters.

Environmental Impacts

No-Build Alternative

There would be no impact to surface waters under the No-Build Alternative.

Build Alternative

The Build Alternative would utilize existing bridges above the North Branch of the Chicago River and the CSSC; there would be no modifications to navigable waterways as part of this project. Given that the project area is already highly urbanized, there would be no increase in impervious area as part of this project. Alterations and minor changes to topography would not greatly affect the direction of drainage through the project area and would not change drainage within the watershed. Since the new BRT service would replace automobile trips, there would be an associated reduction in roadway pollutants. As a result, no adverse impact on surface waters is anticipated.

4.9.2 Groundwater

Groundwater is not a drinking water source within the project area. There are no sole source aquifers in the project area.

Environmental Impacts

No-Build Alternative

There would be no impact to groundwater under the No-Build Alternative.

Build Alternative

Due to the predominance of impervious surfaces throughout the project area, minimal percolation to the underlying groundwater occurs. Therefore, any potential increases in contaminated surface water runoff as a result of the Build Alternative would have no adverse impact on groundwater quality.

4.9.3 Wetlands

Under the National Wetland Inventory (NWI) Program, the U.S. Fish and Wildlife Service (USFWS) maintains a digital database of wetland and surface water resources in the United States. The NWI was reviewed including updates made by Ducks Unlimited, a wetlands conservation organization, to identify any wetlands or surface waters within the project area. According to the updated NWI maps, both the North Branch of the Chicago River and the CSSC are listed as riverine wetlands. Riverine wetlands include wetlands and deep water habitats contained in natural or artificial channels that periodically or continuously contain flowing water.

A review of the NWI database and the Illinois Department of Natural Resources□(IDNR) Ecological Compliance Assessment Tool (EcoCAT) for any wetlands located within 200 feet of the proposed project identified no wetlands in the project area other than North Branch of the Chicago River and CSSC (**Appendix E-6**). A review of the National Resources Conservation

Service Soil Data identified no hydric soils within 200 feet of the proposed BRT stations. Sites that have soils classified as "not hydric" are unlikely to contain wetlands. The 200-foot buffer was determined to be suitable for this analysis as it would capture any potential impacts outside of the project that might be affected by construction activities.

Environmental Impacts

No-Build Alternative

There would be no impact to wetlands under the No-Build Alternative.

Build Alternative

Since the Build Alternative would utilize existing bridges over the North Branch of the Chicago River and the CSSC, and would be limited to BRT operations along Ashland Avenue, limited physical modifications or ground disturbance would occur. As a result, no impact to wetland resources is anticipated from the project.

4.9.4 Floodplains

Executive Order 11988 requires federal agencies to avoid impacts associated with the occupancy and modification of floodplains. Two floodplains on Federal Emergency Management Agency Flood Insurance Rate Maps were identified within the project corridor: (1) along the North Branch of the Chicago River and (2) along the CSSC.

Environmental Impacts

No-Build Alternative

There would be no impact to floodplains under the No-Build Alternative.

Build Alternative

Since the Build Alternative would utilize existing bridges over the North Branch of the Chicago River and the CSSC, and would be limited to BRT operations along Ashland Avenue, limited physical modifications or ground disturbance would occur. As a result, no impact to existing floodplains is anticipated from the project.

4.10 Biological Resources

Nature areas along the project corridor listed in *the Chicago Nature and Wildlife Plan* include the following:

- Canal Origins Park 2800 S. Ashland Avenue, east of Ashland Avenue, south of the CSSC and north of the Stevenson Expressway. This site is among the best fish habitats in the city and is a stopping ground for migrating birds.

- Webster Wildlife Site 2200 N. Ashland Avenue, east of Ashland Avenue and south of the North Branch of the Chicago River.

The IDNR EcoCAT database was consulted for information about known occurrences of State-listed species within the project area (see **Appendix E-6**). The IDNR EcoCAT database recorded occurrences of peregrine falcons (*Falco peregrinus*) between Chicago Avenue and 38th Street. Peregrine falcons are large falcons that are specialized for capturing smaller birds in the air. They typically nest on cliff ledges, and in urban areas they can be found nesting on ledges of tall buildings and high bridges.

Environmental Impacts

No-Build Alternative

No impacts to biological resources would occur from the No-Build Alternative.

Build Alternative

Falcons could be expected to forage for small birds and pigeons throughout the project area. They would be found flying high above the project area and perched on buildings and other structures within the project area. Although peregrine falcons are migratory, falcons have been observed in the Chicago area in the winter in recent years. There are no known nesting pairs along the project corridor. Tall buildings that would be likely to be attractive to nesting falcons do not appear to occur within the project corridor. There is no part of the project corridor that would be expected to provide unique or particularly rich foraging habitat for peregrine falcons. In addition, the project corridor represents a small proportion of a falcon's foraging territory.

The proposed project site is not appropriate habitat for any threatened, endangered, proposed, or candidate species listed by USFWS as occurring in Cook County. Listed species and other protected resources are provided in **Appendix E-6**. Given the highly urbanized nature of the project area, none of these habitats is found near the project corridor.

The project would be limited to BRT operations along Ashland Avenue. Limited physical modifications or ground disturbances would occur. As a result, no adverse impacts to natural native plant communities are anticipated by the project.

The trees along the project corridor occur primarily in the median and the sidewalks of Ashland Avenue. These narrow bands of trees have a lower value to wildlife than blocks of habitat and thus reduce the potential for street tree removal to affect wildlife. During project permitting, a detailed tree inventory would need to be prepared for each work zone. A small number of trees would likely be removed as a result of construction activities. Tree removal would be regulated by local ordinances, would impact the urban tree inventory, and might affect birds protected under the Migratory Bird Treaty Act (MBTA).

If construction occurs at night, then the necessary lighting would generate a temporary adverse impact on wildlife. Throughout much of the corridor, there is considerable night lighting. Light impacts would not be expected to affect birds during the spring or fall migration because migrating birds would experience greater light impacts from the surrounding urban areas. With the implementation of mitigation measures (described below) to avoid impacts on nesting migratory birds, potential light impacts during construction would not be adverse.

Bird species that may utilize trees that could be removed or disturbed during construction could be affected by the project. Potential mitigation measures that would reduce adverse impacts would include the following:

- Tree removal would be timed as much as possible to occur outside the migratory bird nesting season, which occurs generally from April 1 to September 15 and as early as March 1 for some species.
- If construction must occur during the nesting season, two biological surveys would be conducted: one 15 days prior and a second 72 hours prior to the construction that would remove or disturb suitable nesting habitat. The surveys would be performed by a biologist with experience conducting breeding bird surveys. The biologist would prepare survey reports documenting the presence or absence of any protected bird in the habitat to be removed, and any other such habitat within 300 feet of the construction work area. If a protected bird is found, surveys would be continued in order to locate any nests. If an active nest is located, construction within 300 feet of the nest would be postponed until the nest is vacated and juveniles have fledged, and when there is no evidence of a second attempt at nesting.
- Avoidance measures would be incorporated into the design of the project during preliminary engineering where feasible. However, if construction of the project requires removal of a protected tree, a permit would be required in accordance with applicable City of Chicago codes and ordinances in which the affected tree is located. Tree removal permits may require replanting of protected trees within the project area or at another location to mitigate for the removal of these trees. Replanting would be done according to the ratios required by tree removal permits and in a size that is appropriate for the species and setting as determined by an arborist. In addition, planted trees would be maintained such that ninety percent are in good condition after six months, and irrigation would be carried out until the trees are established.

With these measures employed, there would be no measurable impacts on biological resources remaining.

4.11 Geology and Soils

Local topography in the project area is generally flat and varies less than 50 feet with a minimum elevation of 580 feet and a maximum elevation of 699 feet above sea level. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Data was used to confirm that soil within 200 feet of the proposed BRT stations is classified as urban land. This soil type is reserved for highly disturbed soils that have resulted from human activities, and have been altered over time through construction activities. Bedrock is unlikely to be encountered during construction.

Environmental Impacts

No-Build Alternative

No impacts to geology or soils would occur from the No-Build Alternative.

Build Alternative

Construction of the BRT stations would include minimal subsurface excavation. There is the potential to change the soil materials and topography at these locations; however, these changes would be minor and would not result in adverse impacts. Furthermore, the project would, in accordance with federal disposal guidelines, remove urban fill that is potentially contaminated with hazardous materials. Removing this material, disposing of it properly, and as needed, filling with tested materials, could be beneficial to human health and the environment.

4.12 Hazardous Materials

Potential sources of hazardous materials impacts, both within and adjacent to the Ashland Avenue BRT Project, were identified. **Appendix E-7** (*Hazardous Materials Technical Memorandum*) describes the methodology and results are summarized within this section.

A search of local, state, and federal regulatory databases was conducted by Environmental Data Resources, Inc. (EDR) to identify sites that currently or have historically handled, stored, transported, released, or disposed of hazardous or regulated waste, as these types of sites are potential sources of hazardous material contamination. Search distances were either 0.1 or 0.25 mile from Ashland Avenue. The different search distances were based on the type of hazardous materials sites included in the database and the separation distance between the project and these sites at which impacts become unlikely. In **Appendix E-7,** Table 2 and Figure 1 through Figure 6 provide a complete list of each site identified by EDR and their locations.

Eight sites of the greatest concern adjacent to the proposed project are also summarized in Table 3 of **Appendix E-7**. None of these sites listed in Table 3 of **Appendix E-7** are Superfund sites. Five of these sites are located more than 500 feet from proposed station locations. There are three sites within 500 feet of proposed station locations: Medill Material Recovery and Recycling Facility (1633 West Medill Avenue) near the proposed Fullerton station, Compass Rose Boat Club (2841 South Ashland Avenue) near the proposed 31st Street station, and the Wrigley Company (3535 South Ashland Avenue) near the proposed 35th Street station.

There are no known contamination plumes in the project study area. While the potential for contamination exists at any location that has underground storage tanks (USTs) for hazardous materials, the sites identified as having USTs are regularly monitored to ensure they are not leaking and do not threaten human health and welfare.

Given the urban setting of the project area, the potential exists for the presence of typical urban fill throughout the entire project corridor. Typical urban fill materials contain elevated concentrations of polynuclear aromatic hydrocarbons and metals due to nearby roadways, railways, and industrial and commercial land uses and activities. In addition, urban fill may include contaminated building demolition debris. This type of contamination is not necessarily associated with a release from a specific site or source.

Environmental Impacts and Mitigation

No-Build Alternative

The No-Build Alternative would not affect any known hazardous materials.

Build Alternative

Although the project footprint is limited to within the existing right-of-way and no property acquisition is expected, soil and/or groundwater within the right-of-way could be contaminated with hazardous materials from urban fill and/or adjacent or nearby regulated hazardous material sites identified in the database search. Based on this assessment, a number of measures are proposed as part of this project to ensure no impacts result from implementation of the proposed improvements. These measures primarily relate to construction and pre-construction activities as described below. With these project measures incorporated, no impacts to hazardous materials sites would be expected, and no mitigation would be required.

Construction of the proposed project would include subsurface ground disturbance activities, which could result in contaminated soil and/or groundwater being encountered. However, the majority of excavation would be associated with construction of the BRT stations, such as for the slab-on-grade platforms and shelters, and would be limited to the top three to five feet below ground surface. Because of these limited actions, no hazardous material impacts are anticipated. Any contaminated material excavated during construction would be disposed of at a facility permitted to accept such material.

Right-of-way acquisition is not anticipated for this project; however, if it were to occur, there is a substantial potential liability associated with ownership and acquisition of property that is contaminated. A Phase I Environmental Site Assessment (ESA) would be conducted before acquisition of any new properties. Based on the Phase I findings, a Phase II ESA could also be recommended prior to purchasing a property.

Should a Phase II ESA be required, site testing and additional analysis would be conducted to identify whether there is no reasonable risk of contamination at the site, or to confirm and detail the risk of contamination at the site. If a site is contaminated and remediation is needed, the Phase II ESA would provide recommendations for remediation. Once remediation of the site has occurred, there would be no impacts.

4.13 Energy

Energy supplies primarily include sources of energy (e.g., electrical, gas/oil, solar) potentially consumed by the project. The following provides a qualitative assessment of impacts to energy resulting from the Build Alternative.

Environmental Impacts

No-Build Alternative

No impacts to energy would occur from the No-Build Alternative.

Build Alternative

The Build Alternative proposes to provide center running, dedicated bus-only lanes with center station platforms. This would separate BRT services from automobile traffic, thereby improving travel speeds and reliability for the BRT. Improved transit service is anticipated to result in an increase in the transit mode share in the corridor, with more people utilizing the transit system. These changes, in turn, would result in a reduction in the number of automobiles that contribute to VMT in the corridor. As a result, slight improvements to energy efficiency in operating BRT are expected as a result of the Build Alternative compared with the No-Build Alternative.

Further, articulated buses are planned for the corridor, which use less energy per passenger than a standard bus. More efficient, reliable BRT service would also result in greater maintenance of bus flow and limit bus idling times.

Finally, minimal differences in energy use at stations are anticipated as a result of the Build Alternative. Potential offsets of energy use at stations such as solar panels and the use of LED lighting are being considered to further improve energy efficiency at stations.

Based on all of these factors, the Build Alternative is not anticipated to result in major changes to energy consumption.

4.14 Safety and Security

The following discusses potential impacts to safety and security resulting from the Build Alternative.

Environmental Impacts and Mitigation

No-Build Alternative

No changes to the safety and security of pedestrians and transit users would occur under the No-Build Alternative.

Build Alternative

No negative impacts to safety and security are anticipated from the proposed improvements. The Build Alternative would provide several improvements that would serve to increase safety in the corridor. At BRT stations, enhanced lighting, ADA ramps, glass enclosures, and other features would be provided. The design configuration of the project, particularly in the station areas, would incorporate a complete streets approach to Ashland Avenue and create natural traffic calming □in other words, design measures that would ensure the safety and prioritization of all users of the roadway. These measures would include an enhanced pedestrian space in the form of curb extensions with new curb ramps at stations, enhanced landscaped medians between stations to limit dangerous or prohibited pedestrian mid-block crossings, signage and pedestrian striping, median refuge islands at designated mid-block crossings, and a narrower street design with one general use travel lane removed in each direction. While some parking at BRT stations would need to be removed to accommodate the BRT station design, this would translate into enhanced pedestrian access at the station intersections. On-street parking would be retained between stations to create an additional barrier between pedestrians and moving traffic. The result of the design approaches described above would serve to improve the safety of automobiles, pedestrians, and bicyclists along Ashland Avenue.

4.15 Environmental Justice Communities

The Environmental Justice analysis was performed in accordance with related federal and Illinois laws and guidance including Title VI of the 1964 Civil Rights Act, Executive Order (EO) 12898, EO 13166, State Bill 2193, and FTA Circulars 4703.1 and 4702.1B. Further details on the regulatory framework for this environmental justice analysis may be found in **Appendix E-8**.

To establish the presence of low-income and minority populations, year 2010 census data was analyzed for all census tracts within a half mile of the proposed Build Alternative alignment along Ashland Avenue. Figures 1 and 2 in **Appendix E-8** provide maps of minority and low-income populations along the Ashland Avenue BRT corridor. The community area boundaries defined by the City of Chicago typically coincide with geographic features that are more meaningful to residents than census tract boundaries, such as boulevards, freight corridors, highways, and other major divisions between neighborhoods. To avoid artificially diluting or inflating the presence of minority and low-income populations, all census tracts along Ashland Avenue within each affected community area were analyzed to determine whether the community area as a whole contains a predominantly minority or low-income population.

Community areas where populations in the census tracts along Ashland Avenue consist of more than 50 percent minorities were classified as predominantly minority communities. Community areas where the percentage of low-income families in the census tracts along Ashland Avenue is greater than the city-wide percentage of 17.2 percent were classified as communities with concentrations of low-income populations. All community areas containing predominantly minority populations and/or concentrations of low-income populations were classified as environmental justice communities. The findings of the environmental technical memoranda were then analyzed to determine whether impacts and benefits would occur disproportionately in community areas with environmental justice populations.

Table 4-4 presents the summary findings of whether environmental justice populations are present in each community area and additional detailed demographic data is provided in **Appendix E-8**. All of the community areas along the Ashland Avenue corridor south of Kinzie Street and the Union Pacific train tracks have been determined to contain environmental justice populations. These identified environmental justice populations by community area are identified in bold in **Table 4-4** below.

Table 4-4: Summary of Environmental Justice Populations by Community Area

Census Tracts within a half mile of Build Alternative Alignment organized by Community Area [1]	Percent Low-Income	Concentrations of Low-Income Populations [2]	Percent Minority	Concentrations of Minority Populations [3]	Summary Finding: Presence of Environmental Justice Populations
North Center	3.20□	No	18.50□	No	No
Lake View	2.30□	No	17.30□	No	No
Lincoln Park	7.60□	No	17.30□	No	No
Logan Square	0.00□	No	24.40□	No	No
West Town	9.20□	No	36.80□	No	No
Near West Side	15.30□	No	**54.10%**	**Yes**	**Yes**
Lower West Side	**26.60%**	**Yes**	**88.50%**	**Yes**	**Yes**
Bridgeport	**22.60%**	**Yes**	**64.50%**	**Yes**	**Yes**
McKinley Park	13.70□	No	**83.50%**	**Yes**	**Yes**
New City	**29.80%**	**Yes**	**88.10%**	**Yes**	**Yes**
West Englewood	**31.50%**	**Yes**	**99.60%**	**Yes**	**Yes**
Auburn Gresham	**24.10%**	**Yes**	**99.80%**	**Yes**	**Yes**
Washington Heights	**23.80%**	**Yes**	**99.60%**	**Yes**	**Yes**
Beverly	4.00□	No	**52.50%**	**Yes**	**Yes**

1. Analysis included Census tracts within half mile of the corridor. They are organized by community area. Counts do not represent totals for the entire community area, only census tracts within half mile of the project area.
2. Supporting data provided in Appendix E-8 (Table 3).
3. Supporting data provided in Appendix E-8 (Table 6).

Environmental Impacts

This section describes the potential for disproportionate impacts and unevenness of benefits in the project area's environmental justice communities. As identified above, all community areas along Ashland Avenue south of Kinzie Street and the Union Pacific train tracks have been determined to contain environmental justice populations.

No-Build Alternative

The No-Build Alternative would not have adverse environmental impacts. Therefore, no disproportionately high and adverse impacts would occur to low-income or minority populations. However, the No-Build Alternative would lack the benefits of the Build Alternative, including enhanced mobility, economic development, and livability. Bus travel times along Ashland Avenue would remain lengthy and unreliable, thereby limiting the mobility of riders, many of whom are low-income and transit-dependent.

Build Alternative

The design of the Build Alternative would be similar throughout the corridor. The BRT facilities would be constructed within the existing roadway right-of-way along Ashland Avenue, and would not require any displacements. One traffic lane would be removed in each direction to accommodate the addition of dedicated bus-only lanes, and parking would be retained on both sides of the street to allow continued automobile access to local businesses. Sufficient parking is located on adjacent streets throughout the corridor to accommodate small amounts of parking removal at station areas. Local bus service would be retained, which would benefit elderly riders and persons with disabilities who may have difficulty walking to the less-closely-spaced BRT stations. The level boarding and ADA-compliant features at BRT stations would also enhance access to transit service for these groups. Left turn lanes would be removed at most intersections, and left turn movements would be restricted. Some traffic is anticipated to divert to other major thoroughfares nearby, and sufficient traffic calming measures would be implemented to address concerns raised about possible cut-through traffic on residential streets and no adverse impacts are expected. Some drivers may also elect to use transit more frequently due to the improved premium transit service along the corridor. Additional details about roadway and traffic pattern changes are provided in **Section 3.1** of this EA. Mobility and access would improve overall due to the enhanced transit capacity and convenience.

Based on the environmental analyses conducted for this EA, there may be some moderate noise increases from additional BRT vehicles (up to 12 added BRT buses in peak hours) being added to the corridor; however, no significant noise impacts are anticipated to occur as a result of the Build Alternative. In addition, noise levels are expected to be lower with the re-designation of one vehicular travel lane in each direction to a dedicated bus-only lane. With respect to air quality, this project is not anticipated to be a project of air quality concern, would utilize newer and more efficient buses throughout the corridor to reduce air pollution factors, and therefore no impacts are expected. Implementation of the proposed project would provide incentives for more commuters to use the BRT service within the Ashland Avenue corridor. As a result, the number of vehicles spending time in congestion would be reduced and therefore the Build Alternative has the potential to enhance air quality. No other adverse environmental impacts have been identified in this EA from the operation of the BRT project.

Construction related activities would be minimal and temporary at any one location along the project corridor, and would be similar throughout the corridor. These activities would affect all populations within the corridor, including minority and low-income populations, and would consist of repaving and restriping of lanes, sidewalk improvements, temporary lane and sidewalk closures, and placement of shelters and other BRT station features. Temporary traffic delays would be likely during construction and detours would be provided to maintain access for motorists, transit riders, and pedestrians. Construction would be staged so as to limit impacts to the surrounding communities. The CTA would keep community members apprised of construction schedules in readily accessible public locations as well as on the CTA website, and seek community input when developing construction plans.

Operation of the Ashland Avenue BRT Project would result in transportation benefits to all populations within the project corridor, including minority and low-income populations. Benefits would take the form of faster bus service, new BRT stations, landscape and sidewalk enhancements, and associated quality of life improvements. These physical enhancements would also contribute to potential economic development and livability improvements. The BRT service and street enhancements could incentivize new TOD in the corridor, which would be consistent with zoning. BRT facilities would be designed and sited to complement the existing character of the project area neighborhoods. Improvements at intersections would also help reduce the dividing effect between neighborhoods that Ashland Avenue currently has in some areas.

Since the results of the environmental analyses completed for this EA have not identified any adverse impacts associated with the Ashland Avenue BRT Project, the project is therefore not expected to result in disproportionately high and adverse impacts on minority or low-income populations. Furthermore, the overall effects of the Build Alternative are expected to be beneficial, with these benefits accruing to all populations within the project corridor, including minority and low-income populations. Based on these findings, no additional mitigation measures specific to environmental justice would be needed. Based on the findings of the demographic analysis, specialized outreach to organizations representing minority and low-income populations along the corridor was conducted during the EA process to obtain their input on the project. Specifics on the approach to public outreach are included in **Section 5.2**.

4.16 Temporary Construction Impacts

The following section discusses temporary construction impacts resulting from the Build Alternative.

Environmental Impacts and Mitigation

No-Build Alternative

Under the No-Build Alternative, no construction would occur and therefore no impacts would occur.

Build Alternative

Construction would primarily consist of earth removal and hauling, grading, repaving and restriping of lanes, median and landscaping improvements, sidewalk improvements, streetscaping and installation of curb extensions for enhanced pedestrian space at BRT station intersections, and placement of shelters and other BRT station features. Construction would be phased to minimize disruption to businesses and communities.

Specific construction staging requirements would be determined during final design and provided in construction staging plans. Although detailed construction plans are not yet determined, there are options to establish work areas such that several non-contiguous segments could be constructed at the same time. This could assist in minimizing impacts during construction and shorten overall duration such that no more than a few contiguous blocks are under construction at any one time.

CTA and CDOT would keep community members apprised of construction schedules, and seek community input when developing construction plans. Construction schedules would be publicly available and posted on CTA's website. Construction would predominantly take place during daylight hours, and would take into account peak travel hours so as to minimize delays wherever possible. Some nighttime work may be required where specific work activities would disrupt traffic or create safety concerns.

During construction, one lane of traffic along Ashland Avenue would be maintained in each direction to continue to provide vehicular access to public services, facilities, and businesses during regular business hours. Because this project proposes to convert one existing travel lane in each direction to dedicated bus-only lanes, lane closures required for construction would be similar to post-construction conditions.

Traffic delays would likely occur during construction, but would be temporary in nature. Adherence to local, state, and federal construction and temporary traffic management guidelines would result in no lasting adverse direct traffic impacts from the Build Alternative. Detours with alternative routing and appropriate signage would be provided to maintain access for motorists, transit riders, and pedestrians. Some closures to streets and intersections as well as removal of on-street parking would occur; however, these closures would be limited in duration. Detailed maintenance of traffic plans would be developed during final design in coordination with CDOT and the Illinois Department of Transportation (IDOT) to ensure safety during construction and to ensure that emergency vehicle access is not impeded.

Existing bus service would continue to operate within the corridor, with temporary changes to headways and routing anticipated at certain stages of construction. Some temporary closures to existing bus stops may occur as BRT stations are constructed. Should this occur, temporary bus stops would be located at nearby locations during active construction periods. Pedestrian access would be maintained and may include placement of temporary sidewalks and wheelchair access ramps. Passengers and the general public would be informed of construction effects in advance through a variety of communication means. This would include press releases to community organizations and news outlets, website materials, and notifications on local buses and rail stations potentially impacted.

Generally, construction noise impacts, such as temporary speech interference for passersby and individuals living or working near the project, can be expected. In some areas, construction noise impacts can be expected to be greater due to the close proximity of existing housing. However, considering the relatively short-term nature of construction noise at any one location along the project corridor, these impacts are not expected to be substantial.

No major impacts would occur to water resources during construction. Best management practices and the appropriate erosion and sediment control measures would be employed during construction to offset any potential surface run-off or soil erosion.

Prior to construction, procedures for identifying, characterizing, managing, handling, storing, and disposing of contaminated soil and groundwater encountered during construction activities would be developed by the construction contractor as part of the project construction plan. These procedures would cover the entire project area, as it is assumed that all material has at least some level of contamination associated with it. Contaminated material encountered during construction would be disposed of at a facility permitted to accept such material.

No relocation of utilities under the BRT transit-way would be needed. Utility relocation at station areas would consist of valves, fire hydrants, electric poles, utility boxes, and vaults. Where utility access is required underneath station areas, utility relocations may be required; however, this work would be short-term in duration and could be completed in tandem with other lane closure work to minimize impacts to traffic flow during this time.

Health and safety plans for construction activities would be developed by the construction contractors, and read and signed by all workers prior to starting any work. Compliance with the Occupational Safety and Health Act of 1970 (29 CFR 1903), U.S. Department of Labor Occupational Safety and Health Administration (OSHA) processes and guidelines, and the Illinois Employee Classification Act of 2008 (820 [Illinois Compiled Statues] ILCS 185) would be followed. The health and safety plans would identify potential contaminants of concern, required personal protection equipment and procedures, and emergency response procedures.

In summary, no substantial adverse construction impacts are anticipated from construction of the Ashland BRT Project.

4.17 Indirect Effects and Cumulative Impacts

While the other sections of this EA provide analysis and findings on direct impacts of the project, NEPA also requires the consideration of the potential indirect and cumulative impacts of federally funded projects. The following provides further definition of these types of impacts and the methodology of assessing those impacts for the Ashland Avenue BRT Project.

Indirect impacts, also known as secondary impacts, are defined under 40 CFR 1508.8. These impacts are caused by the project or plan, but are separated from direct impacts by time and or distance (yet still in the foreseeable future). Indirect impacts include induced growth and related environmental impacts, such as changes to land use patterns, population density or growth rates, and related effects to air quality, water and other natural systems. To determine the potential indirect impacts of this project, an assessment of the potential for and impacts of induced growth that could result from this project were determined. These factors relate to changes to growth and development expected as a result of the increases in transit accessibility from the project.

Cumulative impacts are defined under 40 CFR 1508.7 as the aggregate result of the incremental direct and indirect effects of a project or plan, the effects of past and present actions, and effects of reasonably foreseeable future actions by others on resources of concern. To identify the potential for cumulative impacts, applicable current and future regional and local plans within the project area were reviewed. In addition, the cumulative impacts assessment included an evaluation of the proposed phasing of this project to assess any cumulative impacts associated with the phased project implementation.

Environmental Impacts and Mitigation

No-Build Alternative

No indirect effects or cumulative impacts are caused under the No-Build Alternative.

Build Alternative

The Ashland Avenue BRT Project would create a new and upgraded, faster and more efficient transit service along the corridor. Enhancing transit access can have a number of indirect effects to growth and development. Indirect effects identified for this project are related to both travel along the corridor, and land use and economic development. These are discussed in further detail below.

Based on regional travel demand model data (see **Section 3.4.2**), transit mode split is anticipated to increase to 26 percent along the corridor as a result of the implementation of this project. Existing and new riders would benefit from enhanced bus speed and reliability. While BRT would offer limited stop service approximately every half mile, local bus service would remain along the corridor to provide service to transit passengers with stops approximately every one-eighth of a mile.

Automobile traffic on Ashland Avenue would decrease due to the removal of one travel lane in each direction and the anticipated mode shifts. Compared to existing (No-Build) conditions, Build Alternative conditions are anticipated to decrease VMT by 35 percent and increase congested VMT by seven percent along Ashland Avenue (see **Section 3.1.3**). Similarly, this would result in a net ten percent decrease in travel speed along Ashland Avenue.

The Build Alternative would result in a traffic shift from Ashland Avenue to other facilities in the surrounding roadway network. However, the results of the analysis indicate that the robust Chicago grid network is sufficient to absorb the traffic shifts across multiple parallel facilities, resulting in minor VMT increases (two percent to 12 percent) along any one facility within the project area. As such, minor indirect impacts to parallel facilities are anticipated to result from the Build Alternative. From a regional standpoint, the traffic analysis indicates a slight reduction in VMT overall as a result of the Build Alternative, resulting in a slight improvement in air quality.

The provision of BRT service on the Ashland Avenue corridor is anticipated to have positive indirect effects to land use and economic development along the corridor. Often, implementation of premium transit services serves to incentivize economic investment along a corridor and transit-oriented development or TOD (mixed-use residential and commercial development that maximizes and supports access to public transportation). Existing land use in the corridor is already largely a mix of these residential and commercial land uses, and the City’s zoning ordinance and land use policies support further development of mixed-use and TOD development in the project study area. Some industrial uses along the corridor have been converted to residential and commercial uses over time as a result of land use policies along the corridor and economic investment, and indirect effects of this project would support those investments. Given the corridor location within designated economic development areas (TIFs, Empowerment Zones, and Enterprise Communities), the Build Alternative is anticipated to have a positive effect on local, regional, and statewide initiatives to support public and private partnership in additional infrastructure improvements along the corridor. Access to local businesses would be improved through the provision of BRT service along the corridor. Minor direct impacts to on-street parking at BRT stations are anticipated to result (between 11 to 12 percent); however, adjacent parking facilities are available to accommodate parking losses near these stations and minimal changes to parking allocations are anticipated.

In sum, no adverse indirect effects are anticipated to result from the Build Alternative. The BRT project is expected to have a positive impact on land use, economic development and transit accessibility, and offers an alternative approach to addressing congestion in the corridor.

To assess the potential for cumulative impacts, a review of the regional TIP, other local and regional plans, and coordination with agency stakeholders was conducted. Planned and programmed projects involve regular maintenance activities, such as repaving and traffic signal timing improvements. Other nearby projects of note being implemented in the foreseeable future include:

- **Ashland Avenue at Pershing Road** – This project involves reconstruction of a portion of Ashland Avenue at Pershing Road once an existing viaduct is removed. Based on coordination efforts to date with CDOT, plans for this reconstruction on Ashland Avenue were obtained and are being used in the development of conceptual engineering plans for this project. Continued coordination with CDOT would occur as this project moves forward to coordinate these efforts.

- **Bloomingdale Trail** – This project involves converting approximately 2.7 miles of an old railroad line along Bloomingdale Avenue from Ashland Avenue on the east and continuing west to Ridgeway Avenue. Construction of this project began in summer 2013. Coordination is ongoing with DHED to ensure consistency between these projects. The proposed Build Alternative would enhance the surrounding pedestrian environment in this area and further support complete streets efforts in the area.

Regular and routine maintenance projects, such as signal timing and repaving would not impact construction of the Ashland Avenue BRT Project. As projects continue to be identified through conceptual engineering and into final design, coordination with CDOT, DHED, CMAP, IDOT, Cook County Department of Transportation and Highways (CCDOTH) and other agencies (as appropriate) would continue for all project efforts. No cumulative impacts are anticipated to result from these planned and programmed activities.

In addition to the planned and programmed improvements described above, the cumulative impacts assessment considered whether phased planning of this project would result in cumulative impacts. A proposed schedule for phased implementation is provided in **Section 2.3**. Phase 1 and the subsequent Phase 2 of this project would not be constructed at the same time. Phase 1 would be operational prior to construction beginning on Phase 2. Outside of the Phase 1 limits, the BRT service would stop at the BRT station locations using existing curbside bus stops for the remainder of the 16.1-mile corridor until the next phase is built. As final design plans for Phase 2 are completed, transit operational plans would be developed to maintain transit access along the corridor until both phases are built out. No cumulative impacts are anticipated to result from the phasing of this project.

5. AGENCY COORDINATION AND PUBLIC INVOLVEMENT

The Chicago Transit Authority (CTA) and the Chicago Department of Transportation (CDOT) conducted a year-long planning effort as part of the Alternatives Analysis (AA) process to arrive at the selection of a Preferred Alternative (Build Alternative) along Ashland Avenue. Further details on the AA process are discussed in **Section 2.1** of this Environmental Assessment (EA). This effort included an extensive public outreach program with six public open houses and a number of other stakeholder and agency outreach efforts. During the environmental study phase of this project, CTA and CDOT continued to engage the community, elected officials, and other agencies in the project's development. Public outreach activities conducted during the environmental study phase included general outreach, environmental justice outreach, community meetings for concept designs, agency coordination, stakeholder and technical advisory meetings, elected official briefings, and a round of public hearings. Information obtained through public and agency involvement has been incorporated into this EA and the project development.

5.1 Agency Coordination

Coordination with agencies directly affected by the project was undertaken as part of the EA. At a local level, both CDOT and the Chicago Department of Housing and Economic Development (DHED) are project partners and concept plans have been developed with full coordination of these agencies. Final design plans would also be developed with full coordination of these agencies. Both departments have provided technical input and were involved in all aspects of project development. Other city departments, such as the Mayor's Office for People with Disabilities (MOPD), were also engaged during the process and received presentations and status updates on the project analyses, with opportunities for providing input throughout this EA process.

In addition to local agencies, coordination at the regional, county, and state level was also conducted. This included coordination with Cook County, the Illinois Department of Transportation (IDOT) and Metra to provide background about the project, the EA process, and to provide an opportunity for comments. CTA and CDOT met with Cook County Department of Transportation and Highways (CCDOTH) and IDOT to discuss the project. Additional meetings with these organizations took place from May through August 2013. Meetings were scheduled prior to concept design community meetings and occurred once more prior to the public hearings on the EA. A list of these agency coordination meetings is provided in **Appendix F-3**.

5.2 Public Involvement Plan

The following provides details on specific outreach efforts included in the Public Involvement Plan for this project. A full listing of public involvement meetings and media articles regarding the project are provided in **Appendix H**. All comments and responses will be summarized in the final EA.

5.2.1 General Outreach

Throughout the environmental process, CTA and CDOT continually prepared and distributed public information materials to update the public on the project at key milestones in project development. A press release, fact sheet, and pamphlet were developed to provide an overview of the project and the opportunities for public input. This information and further details on the project characteristics and project status were continually updated on the project website (www.transitchicago.com/ashlandbrt). A project e-mail address was included on all outreach materials for the public to contact CTA and to submit comments.

After the Preferred Alternative was announced, CTA also initiated a mobile texting campaign published on its website to inform the public about and gauge support for the Ashland Avenue Bus Rapid Transit (BRT) Project. Car cards (posters placed in buses and at rail stations) with the project information and how to participate in the campaign were also placed on approximately 257 CTA buses and in 11 rail stations. The public was able to text support of the project and/or text to obtain more information about the project. Supporters were asked to provide their address so that CTA could track support by geographic areas. At the end of October 2013, 654 people have texted their support of the project, 278 people have signed a petition in support of the project, and 273 people have requested further information on the project.

5.2.2 Environmental Justice and Limited English Proficiency

As part of the EA, an environmental justice analysis was performed to identify low-income and minority populations that may be affected by the project. The analysis found that minority and low-income populations are present in the central and southern portions of the project corridor. Organizations representing these populations were contacted via e-mail and U.S. postal service through which they received a project fact sheet, directions to the project website for additional information, and contact information for submitting comments. These groups were also provided information on the public hearing. A list of the organizations contacted is included in **Appendix E-8.**

In addition, as part of CTA's public outreach efforts during the AA phase of the project, a Limited English Proficiency (LEP) analysis was also conducted to determine if language support was needed during the public outreach process. Based on this analysis, in addition to English, outreach materials have also been provided in Spanish, and a Spanish interpreter would be made available for the EA public hearing. All Spanish materials were translated to be linguistically appropriate and culturally competent. A sign language interpreter would also be provided at the EA public hearing. In addition, because there are isolated areas of Chinese and Polish-speaking LEP populations, public notices also included an offer of additional interpretation services with advance notice.

5.2.3 Community Concept Design Meetings

During the conceptual engineering phase, several rounds of small-group community meetings were conducted. These community meetings were focused on the Phase 1 area (from Cortland Street on the north to 31st Street on the south) and took place in June and July 2013. The purpose of these meetings was to provide information on the proposed conceptual design and obtain feedback for use in the final design of Phase 1. Similar meetings with community groups from the remainder of the corridor would occur during future phases and prior to final design in those respective areas.

5.2.4 BRT Steering Committee

A BRT Steering Committee was formed as part of Chicago's overall efforts to develop BRT in the City of Chicago. The BRT Steering Committee comprises representative stakeholders, public agencies, and civic groups, including the Metropolitan Planning Council, Active Transportation Alliance, Urban Land Institute, Civic Consulting Alliance, Chicago Community Trust, and Chicago Architecture Foundation, in addition to CTA, CDOT and DHED. The group is a supporter of the Ashland Avenue BRT Project and continues to meet regularly to discuss this project and other Chicago BRT projects. The BRT Steering Committee has been afforded an opportunity to provide feedback on the project.

5.2.5 Elected Official Briefings

Elected officials, including aldermen and staff, were continually briefed on the project. Briefings provided background about the project, the EA process, and project status updates. Opportunities for briefings with aldermen were also offered prior to concept design community meetings in June and July of 2013. Briefings with aldermen were offered prior to the public hearings on the EA to solicit any additional feedback. Details on engagement with the aldermen are included in **Appendix H**.

5.3 EA Distribution and Public Comment Period

The Federal Transit Administration (FTA) has issued a Notice of Availability for this EA to provide the public an opportunity to review and comment on the EA. All comments received during the 30-day public comment period will be incorporated into the EA, and responses to comments will be published as part of the final EA. The EA was also sent to participating and cooperating agencies for their comments. A copy of the EA is available on the CTA website (www.transitchicago.com/ashlandbrt), and at CTA headquarters. Copies of the EA are also available at the following libraries during the public review period:

- Lincoln Belmont, 1659 W. Melrose Street, Chicago, IL 60657
- West Town, 1625 W. Chicago Avenue, Chicago, IL 60622
- Lozano (Pilsen), 1805 S. Loomis Street, Chicago, IL 60608
- West Englewood, 1745 W. 63rd Street Chicago, IL 60636
- Harold Washington Library Center, 400 S. State Street, Chicago, IL 60605

5.3.1 Public Hearings

Two public hearings are scheduled to solicit comments from the community about findings presented in the EA. The public hearings were advertised through display ads in local and regional newspapers, an email blast, and through CTA press releases, flyers, and transit alert cards placed on CTA buses and rail stations within the project corridor. Additional details concerning the public hearings were also posted on CTA's website. Meeting locations are within the project area and are Americans with Disabilities Act of 1990 (ADA)-compliant and accessible by public transit. Comments received during the public hearings will be submitted to the FTA and entered into public record. Written comments will also be accepted via U.S. mail and email.

5.3.2 Next Steps

While subject to final public comments received during the 30-day comment period and at the public hearing, FTA expects to find that there would be no significant impacts from the project and to issue a Finding of No Significant Impact (FONSI). The FONSI document would summarize the results of the EA and would reflect all applicable public and agency comments and responses. FTA and CTA would distribute the FONSI to federal, state, and local agencies. Copies of the FONSI would be made available upon request by the public.

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Appendix A-1: Purpose and Need Statement

Due to the large size of the Appendices, they have been removed from this document; however, they are available at CTA's office, upon request.

PURPOSE AND NEED STATEMENT

Western & Ashland Corridors Bus Rapid Transit (BRT) Project

Prepared for

Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661

August 14, 2012

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Appendix B: Goals and Objectives Criteria

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Section 1 Introduction

The Chicago Transit Authority (CTA), in cooperation with the Federal Transit Administration (FTA), is conducting an Alternatives Analysis (AA) for implementation of bus rapid transit (BRT) service along the primarily north-south corridors of Western Avenue and Ashland Avenue. Implementation of premium transit along these two corridors is planned as part of a citywide BRT network identified as part of the Chicago Metropolitan Agency for Planning (CMAP) 2040 regional long range transportation plan (LRTP) and has evolved through a series of studies, most recently codified in the Metropolitan Planning Council (MPC) 2011 report, Integrating Livability Principles into Transit Planning: An Assessment of Bus Rapid Transit Opportunities in Chicago.

This AA will use Bus Rapid Transit (BRT) as the preferred mode and focus on a multi-tiered evaluation of BRT features within the existing Western and Ashland Avenue Corridors. BRT is being used as the mode choice for this AA because it was identified by previous CTA system planning efforts. The ultimate goal of the AA is to select a Locally Preferred Alternative (LPA) that can move forward through the environmental documentation, design, construction, and operation phases.

This report documents the Purpose and Need for the project, including information about why transit improvements are needed along these corridors and how recommended improvements will be measured in selecting a LPA. A detailed analysis of the existing conditions included in this purpose and need may be found in the *Western and Ashland Avenues Existing Conditions Report* (**Appendix A**). All documentation within this Purpose and Need has been developed using FTA program guidance and in accordance with federal New Starts and Small Starts program regulations.

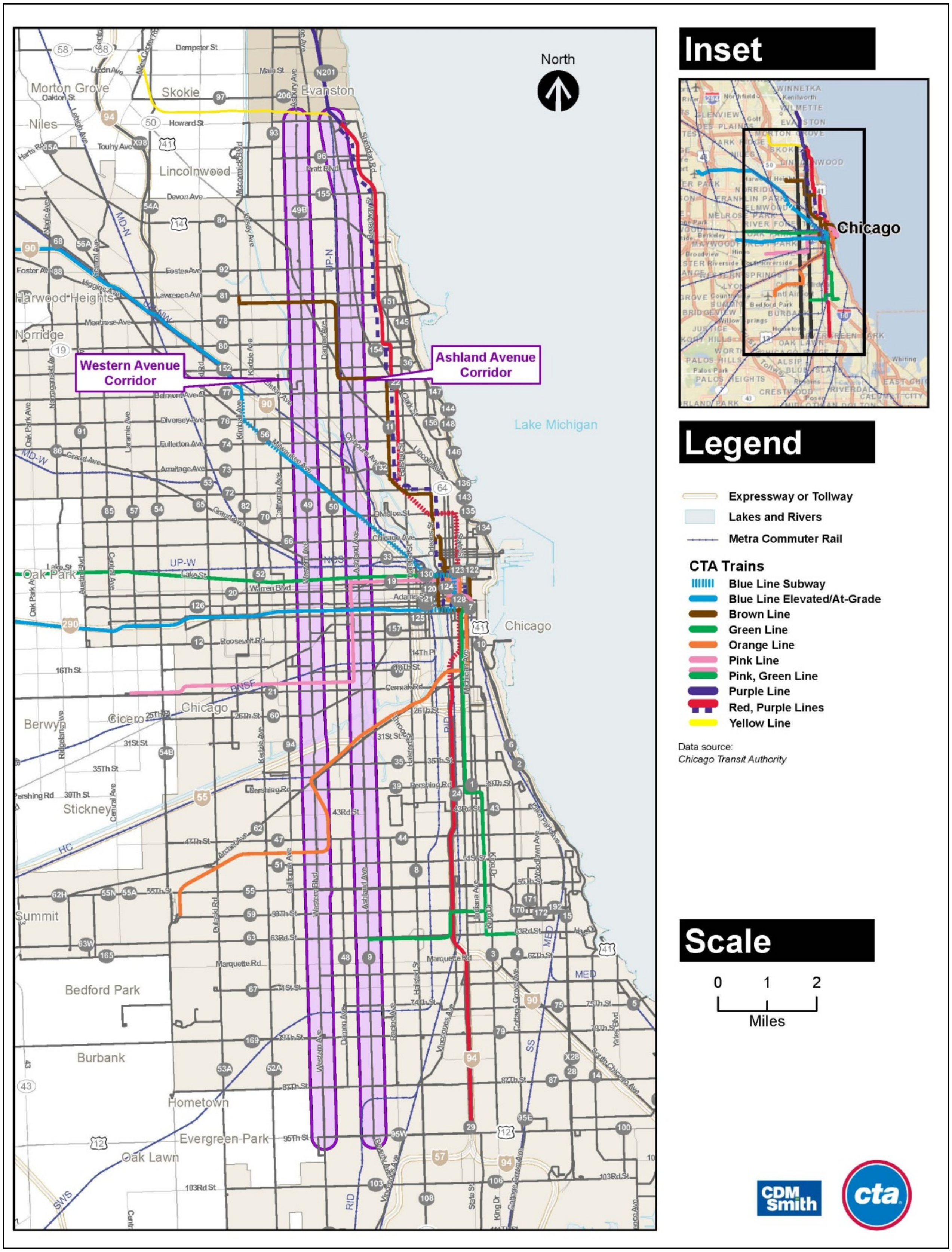
1.1 Study Area Context

Located approximately 2.5 and 1.5 miles, respectively, west of Chicago's "Loop" (the central business district), the Western and Ashland Corridors (shown in **Figure 1-1**) span approximately 21 miles in length. Corridor limits extend along both the Western and Ashland Corridors from Howard Street in the north to 95th Street in the south. For study purposes, the Ashland Avenue alignment transitions to Clark Street near Ridge Avenue (approximately 5800 north), and continues along Clark Street to Howard Street, the northern border of Chicago. Demographic characteristics for all Census tracts within a quarter mile of the Western and Ashland Avenue Corridors as well as all tracts between the two Avenues were used to define the study area and information was analyzed based on most recent 2010 U.S. Census data to identify an existing study area demographic profile. This study area boundary was chosen based on assumed reasonable walking distances to the corridor from surrounding residential areas.

STUDY AREA PROFILE

Population:	**677,306**
Number Jobs:	**187,400**
Neighborhoods:	**55**
Historic Neighborhoods:	**10**
Wards:	**28**

Figure 1-1 Study Area



Data source:
Chicago Transit Authority

This study area is the location of a large number of residential, employment and activity centers in Chicago as well as home to a large number of transit dependent populations. As the desire for development and more affordable housing options has resulted in greater development outside of Chicago's "Loop", residential and other development along the Western and Ashland Corridors has seen rapid growth.

According to U.S. Census data, the Western and Ashland Avenue study area is now home to over 677,000 people (roughly 25 percent of the population in Chicago), over 187,000 jobs, and intersects with 28 of the city's 50 Aldermanic Wards. While over 50 percent of the land use in the study area is medium to high density residential (including single family, multi-family and mixed use), there are also 28 hospitals and several other health and social services in the study area that make up over 40,000 jobs (approximately 21 percent of total jobs in the corridor).

Most notably, the large Illinois Medical District is located in the central portion of the study area and serves as an economic cluster of health care jobs. Covering 560 acres and employing over 20,000 workers, the Illinois Medical District is the nation's largest urban medical district and largest college of medicine. The medical district is also the State of Illinois' largest biotechnology/medical complex and serves as an economic engine in the state, generating $3.3 billion in economic activity to date.[1] Other notable industries include retail trade (25,710 jobs or 13.7 percent of the total jobs in the corridor) and manufacturing (22,042 jobs or 11.8 percent of the total jobs in the corridor). In addition, the corridors intersect 10 historic neighborhoods whose rich cultural diversity and amenities bring residents and visitors alike to the area for shopping and recreational activities year round.

In addition to these predominant residential, commercial/retail and institutional land uses, industrial uses are also found sporadically throughout the corridor. Two waterways flow through the study area, including the south branch of the Chicago River and the Sanitary and Ship Canal, which connects the Des Plaines River and the Chicago River. Industrial uses flank these waterways, which historically provided water transport that supported industrial activities. Similarly, industrial uses are located along the rail corridors that pass through the study area, including the Union Pacific, BNSF and Heritage Corridors. Over time and due to growth patterns and economic shifts, a number of industrial uses in these areas have now been converted to retail and commercial uses.

Along with land use factors, a number of economic development districts and initiatives help define the study area setting. The Western and Ashland Corridors intersect with 28 of the City's 160 Tax Increment Financing (TIF) districts. There are five industrial corridor TIF's, including Pilsen, North Branch, Western/Ogden, Kinzie, and 79th/Southwest Highway. The remaining TIFs are mixed-use (residential and commercial) and encompass most of the retail-focused streets within the corridor. The Western and Ashland Avenue Corridors also intersect what were the three Empowerment Zones in the City of Chicago –West Side, Pilsen, and Southside. In addition, the corridors intersect with two of the City's three Enterprise Communities - Englewood and Westside – as well as three of the six state designated enterprise zones in Chicago (Chicago Zones 1, 4 and 6). A number of tax and business incentives are in place through the Illinois Enterprise Zone Program. These enterprise and empowerment zone strategies serve to incentivize economic development in these areas and help shape development over time.

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[1] Illinois Medical District Commission. *Facts and Figures*, http://www.imdc.org/about/facts-figures, September 2012.

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Section 2 - Problem Definition

In analyzing conditions along the corridors, a number of problems help define the overall need for premium transit service options and these are described in greater detail below. These factors, along with contextual issues in the corridor, such as economic development strategies, help to define the purpose statements for the project, as described in **Section 3**. Identified problems include:

- Regional Growth Patterns Outside of Chicago's "Loop"
- Congestion and a Lack of Competitive Travel Options
- Large Number of Transit Dependent Customers
- Lack of Non-Downtown North/South Fast Transit Alternatives
- Slow Bus Speeds and Frequent Stops
- Unreliable Bus Travel Times
- Street Design Issues No Longer Meet Corridor Needs or Land Use Policy Objectives

2.1 Regional Growth Patterns

CTA operates the nation's second largest public transportation system, a regional transit system that serves the City of Chicago and 40 neighboring communities. Regional transit services are also provided by sister agencies, Metra and PACE, both of which connect with CTA bus and rail in numerous locations. CTA provides 1.64 million rides on an average weekday, accounting for over 80 percent of all transit trips taken in the six-county Chicago metropolitan region. Presently, CTA service is provided by two modes: bus and rail. The CTA rail system was originally designed to serve a traditional commute pattern to connect suburban residences with jobs in the Loop. The rail system serves this market well; however, development patterns over the past few decades have created jobs and activity centers outside of the Loop, including in the Western and Ashland Corridors, which have resulted in a shift of the City's commuting patterns. In addition, bus service performance has not been able to keep pace with this shift. Cost effective investments in premium transit options that maximize existing corridors and support infill and redevelopment efforts are necessary to meet these existing transportation challenges. These investments are also necessary to effectively implement the transportation infrastructure necessary to meet future growth, which is anticipated to bring over 3.2 million residents to Chicago by 2040. CMAP's *GO TO 2040 Plan* identifies four comprehensive strategies for addressing this growth, including a focus on livable communities and regional mobility. The plan calls for prioritizing investments that help to achieve regional objectives and maintain and modernize the existing transportation infrastructure, and identifies public transit and the development of BRT options as key to meeting future growth.

2.2 Congestion and Lack of Competitive Travel Options

Because of the large number of residents (677,306) and jobs (187,414) in the study area and these shifts in regional development and growth, commuting patterns are a source of significant travel demand in the corridors and travel times are slow. Average daily vehicular traffic accounts for as many as 38,900 trips on Western Avenue and as much as 34,100 trips on Ashland Boulevard.

According to 2010 travel time index data (TTI), the increased automobile travel demand along the corridors has resulted in up to 23 percent and 33 percent longer AM travel times and up to 46 percent and 30 percent longer PM travel times in the Western and Ashland Corridors, respectively.

Exacerbating travel demands are a number of bus routes sharing the roadway with vehicular traffic. In 2011, the CTA average weekday bus ridership along Western and Ashland Corridors was 34,855 and 30,816, respectively. The ridership along the corridors represents the second and third highest ridership routes within the entire CTA bus system and first and second highest north-south ridership routes. Travel time runs conducted during the 2010 MPC BRT study indicate that AM peak hour travel speeds are between 43 and 66 percent slower than free flow speed. Compared to automobile travel speeds, buses typically experience between 35 and 55 percent slower travel speeds along the Western and Ashland Avenue Corridors. **Figure 2-1** depicts the average commute time for persons traveling in a personal vehicle verses persons traveling via public transit.

- ***Personal Vehicle Commute Time*** - The central part of both corridors has commute times ranging from 20 to 35 minutes. On the north end of the corridors, the average commute time increases to 30 to 40 minutes. The south end of both corridors increases to 30 to 60 minutes.

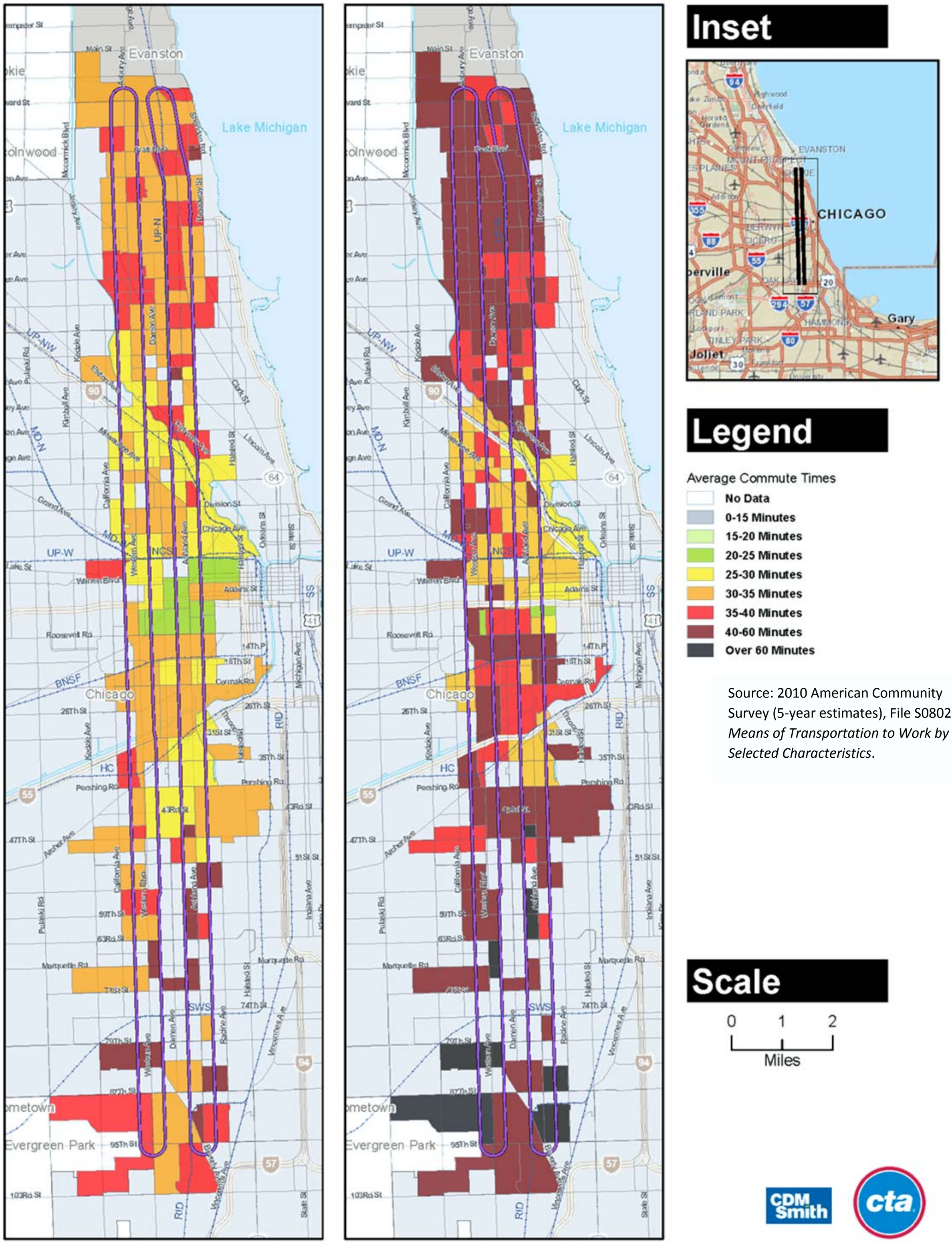
- ***Public Transit Commute Time*** – The central part of both corridors has commute times ranging from 30 to 40 minutes. The northern end of corridors has mostly 40 to 60 minute commute times. The southern part of the corridors report 40 to over 60 minutes for average commute times.

Despite the large ridership in the corridors, these comparative commute times indicate that public transit does not currently provide a competitive travel option compared with the automobile. To effectively address congestion, efficient premium transit service in the corridor is needed that both provides a competitive commuting option for existing riders and attracts new/additional riders to the system.

2.3 Large Number of Transit Reliant Passengers

A large number of public transit customers living along Western and Ashland Corridors are transit dependent. This core transit market includes customers who use public transportation as a primary travel mode due to age, mobility impairments, economic level, or lack of access to an automobile. Minority populations make up over 63 percent of the total population in the corridor and approximately 21 percent of the population in the corridor is either under 18 or over 65. In addition, almost a quarter of the low-income population in Chicago resides within the study area, and over 45,000 or 25 percent of the population within Chicago that does not have access to a vehicle reside in households within the study area. Demographic data for the study area and compared with Chicago as a whole are provided in **Table 2-1**.

Figure 2-1: Comparative Average Commute Times



Automobile Commute **Transit Commute**

Source: 2010 American Community Survey (5-year estimates), File S0802, *Means of Transportation to Work by Selected Characteristics*.

Table 2-1: Demographic Indicators

Indicator	Totals			Density (per Acre)		
	Study Area	Chicago	% of Total	Study Area	Chicago	% Difference (Study Area vs Chicago)
Population	677,306	2,695,598	25.1%	21.2	18.2	+ 3.0
Minority (Non-White)	428,601	1,840,881	23.3%	13.4	12.4	+ 1.0
Low-Income (Families)	23,340	99,968	23.3%	0.7	0.7	--
Youth	61,499	269,666	22.8%	1.9	1.8	+ 0.10
Senior	80,960	396,170	20.4%	2.5	2.7	- 0.2
Limited English Proficiency (Households)	24,592	100,314	24.5%	0.8	0.7	+ 0.10
No Vehicle Available	45,507	183,003	24.9%	1.4	1.2	+0.2

Sources: 2010 Decennial Census (100% data); 2010 American Community Survey (5-year estimates)
Notes: (a) 31,995 acres in study area census tracts; (b) 148,225 acres in City of Chicago census tracts.

2.4 Non-Downtown North/South Connections Lack a Fast Transit Alternative

The CTA rail system was originally designed to serve a traditional commute pattern to connect neighborhoods with jobs in the Loop. The rail system serves this market well, though as mentioned above, development patterns over the past few decades have created jobs and activity centers outside of the Loop, resulting in a shift in the City's commute patterns. Currently, 30 percent of all commute trips begin outside and end inside the Loop, while approximately half of all commute trips have both origins and destinations outside of the Loop[2]. As a result, developing fast north-south connections outside of the Loop is essential to effectively addressing commuter needs in the region.

While bus service currently connects riders in the corridors to 14 rail stations and 64 bus routes, the existing bus service does not provide fast transit options for travel within the corridors or to the number of passengers transferring to other routes to reach their destinations. Based on CTA bus and rail ridership data from September 2011, between approximately 19 and 26 percent of all Western and Ashland Avenue Corridors weekday primary north-south bus riders transfer to/from CTA rail service. Based on CTA bus ridership data from September 2011, between 66 and 75 percent of all Western and Ashland Avenue Corridor weekday primary north-south bus riders transfer to/from other bus routes. Quick and efficient connections within the corridor are needed to facilitate travel throughout the Chicago area.

2.5 Slow Bus Speeds and Frequent Stops

The Western and Ashland Corridors include medium- to high-density developments which affects the speed and flow of vehicles, including buses, due to increased pedestrian foot traffic and activity in the corridors. For much of the latter part of the 20th Century, it is recognized that roadway improvements have been prioritized to optimize automobile traffic while improvements to support pedestrians, bicyclists and transit users were often neglected. As a result of these policies, many travelers continue to choose single occupant vehicles over public transit. This increased density and automobile use has led to congested conditions along both corridors over time. However, recent trends suggest that automobile use is on the decline in Chicago and across the nation. According to the U.S. Bureau of Transportation Statistics, annual vehicle miles traveled peaked in 2005 and has been decreasing ever since. Mirroring this trend, annual vehicle miles traveled in Chicago over the last 15 years has also been decreasing, flattening out in the late 1990's to early 2000's to around 8.2 billion vehicle miles and continuing to decline to 7.2 billion vehicle miles in 2011.[3] With this trend comes a renewed focus on alternatives to single occupant vehicles.

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[2] Chicago Transit Authority. *Circle Line Alternatives Analysis*, 2009.

Existing bus and rail headways along the Western and Ashland Corridors are typically 5 to 30 minutes, depending on the route and time of day, with more frequent service during the peak hours. When express bus service was previously operated in the corridors as an additional overlay service, headways ranged from 15 minutes peak to 20 minutes off-peak. The average weekday bus travel speed along Western and Ashland varies. In some segments, buses travel very slowly, at rates of 9 mph or less, while others meet or approach 15 mph speeds, a desirable goal. Bus service is slow or deficient for a number of reasons: (1) Buses sharing the lane with mixed traffic, (2) Frequent stops, (3) Long dwell times at stops due to slow passenger boarding and on-board fare collection, and (4) Vehicle restrictions when driving in congested traffic. Within the corridors, there are currently 166 northbound and 161 southbound CTA bus stops along Western Avenue and 148 northbound and 148 southbound CTA bus stops along Ashland Avenue (including Clark). The sheer number of stops combined with buses operating in mixed traffic and other factors create these speed issues. Limited stop premium transit service is needed in the corridors to improve these slow operational issues.

2.6 Unreliable Bus Travel Times

The importance of reliable transit service along the Western and Ashland Corridors and for CTA in general is critical to providing the transit customer good, consistent service. Unreliable transit service also results in increased labor and maintenance costs and reduced efficiency. One measure that identifies service reliability is the on-time performance of routes. It is a common measure used in the transit industry and is compared to the posted scheduled time. CTA bus reliability for Route #9 along Ashland and Route #49 along Western is shown in **Table 2-2** for FY 2009, 2010, and 2011. The agency definition of "on-time" performance for the corridors is between one minute early and five minutes late.

Table 2-2 Bus On-Time Performance[4]

Corridor	Route(s)	On-Time Performance		
		2009	2010	2011
Western Avenue	49,49A,49B	79%	76%	75%
Ashland Avenue	9	75%	71%	68%

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[3] Chicago Department of Transportation. *Safe Streets: A Complete Streets Approach to Designing, Building and Maintaining Chicago's Streets*, September 2012.

[4] Chicago Transit Authority, 2012.

As shown in **Table 2-2**, the Western corridor, with bus route coverage from Route #49, #49A, and #49B, had better on-time performance in 2011 than the Ashland corridor with bus route coverage from Route #9: 75 percent compared to 68 percent of the trips are on-time. Both corridors have experienced decreasing on-time performance in the past three years.

2.7 Existing Street Design No Longer Meets Corridor Travel Needs or City Transportation and Land Use Objectives

The Western and Ashland Corridors were designed to primarily accommodate residential-based vehicle traffic. Western Avenue is designated a Strategic Regional Arterial (SRA) by the Chicago Metropolitan Agency for Planning (CMAP). SRA's are intended to carry larger volumes of traffic at higher speeds as a complement to the region's expressway system. Efforts are made to preserve the level of service on these roadways through appropriate access and traffic signal locations and spacing.

While there are both sidewalks and bus routes along the Western and Ashland Corridors, the bulk of the travel is automobile based. As primary users of the road, the current design provides for car and truck travel, parking and loading. Transit is required to travel in mixed traffic with cars and trucks, stopping to load and unload passengers. While buses are only one percent of the traffic stream, they carry up to 15 percent of the people traveling in the corridor. This type of design is not designed to accommodate transit riders in the same fashion as people in cars.

Realizing the need to balance the needs of automobile traffic with the mobility needs of people in Chicago, CDOT has recently implemented a Complete Streets Policy through its *Safe Streets: A Complete Streets Approach to Designing, Building and Maintaining Chicago's Streets* Manual. This policy guidance reflects a paradigm shift for all of CDOT's projects and programs to provide greater focus on pedestrian and transit riders and less focus on automobiles. Design criteria under this policy has been developed to support context sensitive and modal priorities and to limit rigid engineering standards that have traditionally limited the ability to develop pedestrian and transit focused solutions.

In addition to this statewide guidance focusing on complete streets and pedestrian centered design, a number of local and regional land use plans within the corridors have been developed over the past decade that focus on redevelopment of the area to reconnect neighborhoods, improve bicycle and pedestrian connectivity, enhance open space and parks, and support economic development efforts including transit oriented development. Several of these City plans, including *Reconnecting Neighborhoods* (2009), the *Milwaukee Avenue Corridor Plan* (2008), and the *Near Northwest Plan* (2002) all identify the need for enhancements to the transit system and transit oriented development as part of the study area future.

Section 3 - Project Purpose and Need

The purpose of the Western and Ashland Corridors BRT Project is to expand connectivity to the region's existing transit system by providing a new high quality, high capacity and cost effective premium transit service that will address the transportation needs of expansive population and employment growth outside of the Central Business District (CBD) and support local and regional land use, transportation and economic development initiatives by improving mobility, transit travel times and reliability, and passenger facilities in these heavily transit reliant corridors.

This project purpose and need has been developed to guide the development of alternatives and as an evaluation measure for comparing alternatives. This purpose and need also helps define the scope of the project and is the foundation of the development of the goals and objectives, discussed in **Section 4**. The following subsections provide further detail on the project purpose and need and were developed based on identifying a series of distinct statements that could help address the defined problems within the corridor (discussed in **Section 2**). These five distinct statements were then combined to form the concise purpose and need statement, and include the following:

- Strengthen the north/south connections to CTA and Metra's transit network outside of the CBD, thus improving regional, neighborhood and job connectivity.
- Provide a high quality transit experience by improving reliability, travel speed, and ease of use
- Provide premium transit solutions that meet city/regional livability and mobility goals.
- Provide premium transit solutions that support transportation, land use and economic development goals.
- Develop premium transit solutions that effectively address both physical and financial constraints.

3.1 Strengthen the North/South Connections to CTA and Metra's Transit Network Outside of the CBD thus Improving Regional, Neighborhood, and Job Connectivity

With a population of 677,306 (approximately 25 percent of the population of the City of Chicago), 187,414 jobs, and approximately 45,500 commuters without access to a vehicle, the Western and Ashland Corridors continue to grow and evolve as new investment and changes in policy have created new opportunities and demands for premium service. While these changes have been occurring, transit ridership on these corridors has increased and reliability has gone down. With over 50 percent of the land use in the corridor residential, the need to bring people to other locations in the corridor, such as the Illinois Medical District, as well as connect to other regional transit service through one of the 14 rail stations or 64 bus routes is a driving force to meet the City and CTA's objectives. In order to achieve long term sustainable growth, providing premium transit service is a key to providing efficient access to jobs, shopping, education, and recreational activities.

3.2 Provide a High Quality Transit Experience by Improving Reliability, Travel Speed and Ease of Use

As the corridors have grown and evolved, transit service levels have been modified to meet these growing demands; however, based on local bus standards for stop spacing, this has resulted in over 600 bus stops in the corridors. Automobile use has created congested conditions along both corridors. Bus travel times through these corridors have slowed due to frequent stops and traffic congestion, decreasing bus reliability in these corridors – on-time performance has continued to decline in the corridors each of the last three years. The latest measures of on-time performance indicate a 75 percent on time performance along Western Avenue (Routes #49, 49A, and 49B) and an on time performance of 68 percent along Ashland Avenue (Route #9). One of the reasons for the decline in on-time performance in this emerging economic development corridor is slow bus speed. In some cases, bus speeds have slowed to 9 miles per hour (mph) in these 30 mph corridors. With residents, businesses, and some very large employers all located within the Western and Ashland Corridors, providing a high quality bus travel experience is essential to bringing in new riders and provide expanded travel options.

3.3 Provide Premium Transit Solutions that Meet City/Regional Livability and Mobility Goals

BRT can go a long way toward meeting the definition of livability as defined in CMAP's *GO TO 2040 Plan* – the region's long-range plan- which reads, "Livable Communities provide safe, reliable, and economical transportation choices and promote equitable and affordable housing to increase mobility and lower the combined costs of housing and transportation. Through better access to jobs, schools, markets, and recreation, livable communities make the region more economically competitive." Many of these principles are the same as those defined by the USDOT, HUD, and the EPA. The plan identifies the need for BRT and prioritizing transit investments that best utilize and modernize the existing transportation infrastructure to meet regional mobility objectives. Providing premium BRT alternatives and establishing cost effective multimodal corridors along the Western and Ashland Corridors will serve to support these regional objectives and strategies.

Implementation of premium BRT service with better regional connectivity and more efficient connections will also provide incentives for more commuters to use public transit in the corridors. As a result, the number of vehicles spending time in congestion would be reduced and the potential for enhancement to air quality will be realized, in line with regional livability goals to manage and conserve resources. Improved access to educational and job opportunities are also expected to result from implementation of BRT service in the corridors, which are expected to further the "human capital" objectives within the regional plan.

3.4 Provide Premium Transit Solutions that Support Transportation, Land Use and Economic Development Goals

While there are both sidewalks and existing high ridership bus routes along the Western and Ashland Corridors, a large number of trips are still automobile-based, with annual average daily traffic volumes of approximately 37,000 and 34,000 vehicles per day, respectively. As primary users of the road, the current design provides for car and truck travel, parking and loading. Transit is required to travel in mixed traffic with cars and trucks, stopping often to load and unload passengers. While buses are only one percent of the existing traffic stream, they carry up to 15 percent of the people traveling in the corridor. Recent evidence suggests declining automobile use over the last 15 years in Chicago and as such, there is a need for public transportation to play an enhanced role in meeting regional mobility demands. Thus, any change in road design must be considered in light of the primary design purpose and potential impact it will have on the needs of *all* users. With demands for increased capacity in the corridor, all design options need to be vetted and the weighed by planning and engineering professionals, residents, businesses in the corridor and the general public. The outcome of such an effort will help ensure a realistic and feasible balance of design and engineering concerns and needs.

The study area intersects with 28 of the City's 160 Tax Increment Financing (TIF) districts, three Empowerment Zones, and three Enterprise Communities that incentivize economic development in these areas and help shape development over time. In addition, a number of recent land use plans call for enhancements to public transit, bicycle and pedestrian facilities, open space and parks and transit oriented development (TOD) within specific sections of the Corridors. With the Illinois Medical District located in the central portion of the Corridors and providing over 21 percent of the jobs within the Corridors, solutions should be prioritized to support land use and economic development plans by providing greater access and mobility to these existing and planned resources and facilities.

3.5 Develop Premium Transit Solutions that Effectively Addresses Both Physical and Financial Constraints

Solutions are only feasible if they adequately and honestly address both physical and financial constraints. In a corridor as large as this, there are a number of opportunities and potential constraints. Physical constraints can include factors such as right of way and intersection spacing, while financial constraints can include such factors as operating and capital costs as well as a number of unknown variables. Solutions need to account for these physical and financial constraints. CMAP long range plans call for prioritizing investments that best utilize and modernize existing transportation infrastructure and support economic innovation while increasing the commitment to public transit. Solutions should therefore maximize existing facilities and corridors like Western and Ashland Avenues while providing increased connectivity and mobility.

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Section 4 - Goals and Objectives

Five purpose statements have been developed to guide the alternatives evaluation process. Using these five statements, a set of goals and objectives have been developed below (**Table 4-1**) to provide a comparative analysis of alternatives for this project. The project purpose and goals and objectives were established by the project team. These will be presented through the stakeholder outreach process for comment. More detailed descriptions of the quantitative and qualitative criteria for each of these goals and objectives are provided in **Appendix B**, and will be utilized throughout this AA.

Table 4-1 Project Purpose, Goals and Objectives

Purpose		Goals and Objectives
1	**Strengthen the non-downtown north-south connections to CTA and Metra's rail network while improving regional, neighborhood and job connectivity.**	Expand Premium Transit Network
		Integrate Local Bus Service with Premium Service
		Design interconnectivity with CTA rail, Metra and bus service
		Improve Pedestrian Access
2	**Provide a high quality bus travel experience by improving reliability, travel speeds and ease of use.**	Improve Transit Speed
		Improve Reliability
		Improve Ride Quality
		Improve Waiting and Boarding Experience
		Improve Pedestrian Safety
3	**Provide a BRT alternative in order to meet city/regional livability and economic goals.**	Improve Pedestrian Experience
		Enhance Integration with Adjacent Land Uses
		Enhance Streetscape
4	**Balance road design with current and future demand for increased capacity along the corridors.**	Enhance Street Identity
		Meets Design Standards
		Use Existing Curb-to-Curb Street Width
		Design For Future Expansion Flexibility
		Enforce bus lane restrictions
		Minimize Impacts to On-Street Parking and Loading
5	**Develop premium transit solutions that effectively address physical and financial constraints.**	Minimize Implementation Time
		Minimize Capital Expense Costs
		Minimize Bus Operating Costs
		Minimize Roadway Maintenance Costs
		Use a Unique, Specialized Dedicated Fleet
		Minimize Construction Duration & Intensity

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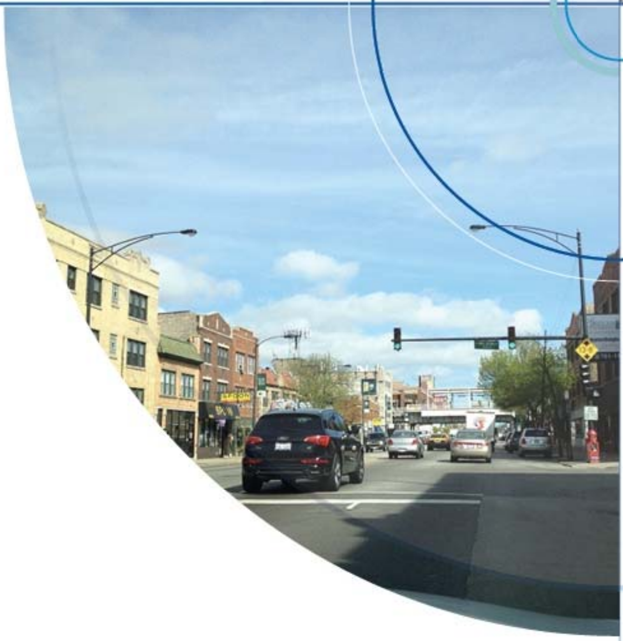
Appendix A-2: Screen 1 Alternatives Report

Due to the large size of the Appendices, they have been removed from this document; however, they are available at CTA's office, upon request.

SCREEN 1 ALTERNATIVES REPORT



Western & Ashland Corridors Bus Rapid Transit (BRT) Project

Prepared for

Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661

October 12, 2012

CDM Smith

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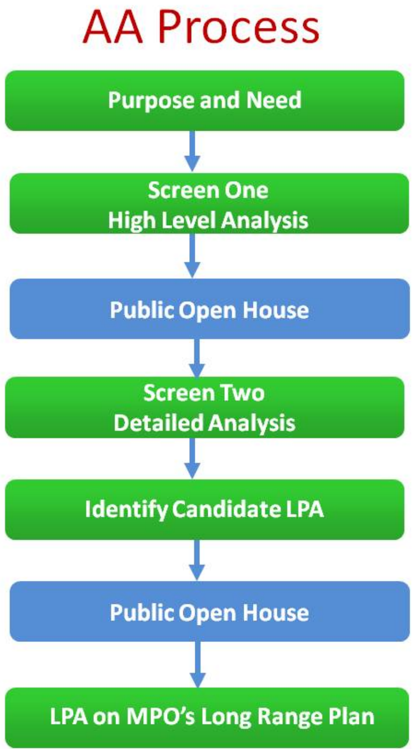
Appendix A: Screen One Alternatives Evaluation Matrix

Section 1: Introduction

The Chicago Transit Authority (CTA), in cooperation with the Federal Transit Administration (FTA), is conducting an Alternatives Analysis (AA) for implementation of bus rapid transit (BRT) service along the primarily north-south corridors of Western Avenue and Ashland Avenue. Implementation of premium transit along these two corridors is planned as part of a citywide BRT network identified as part of the Chicago Metropolitan Agency for Planning (CMAP) 2040 regional long range transportation plan (LRTP). The BRT network has evolved through a series of studies, most recently codified in the Metropolitan Planning Council (MPC) 2011 report, *Integrating Livability Principles into Transit Planning: An Assessment of Bus Rapid Transit Opportunities in Chicago*.

This AA will use Bus Rapid Transit (BRT) as the preferred mode and focus on a multi-tiered evaluation of BRT features within the existing Western and Ashland Avenue Corridors. BRT is being used as the mode choice for this AA because it was identified by a series of previous CTA system planning efforts, as documented in Section 2.1 of this report. The ultimate goal of the AA is to select a Locally Preferred Alternative (LPA) that can move forward through the environmental documentation, design, construction, and operation phases.

1.1 Purpose of this Report



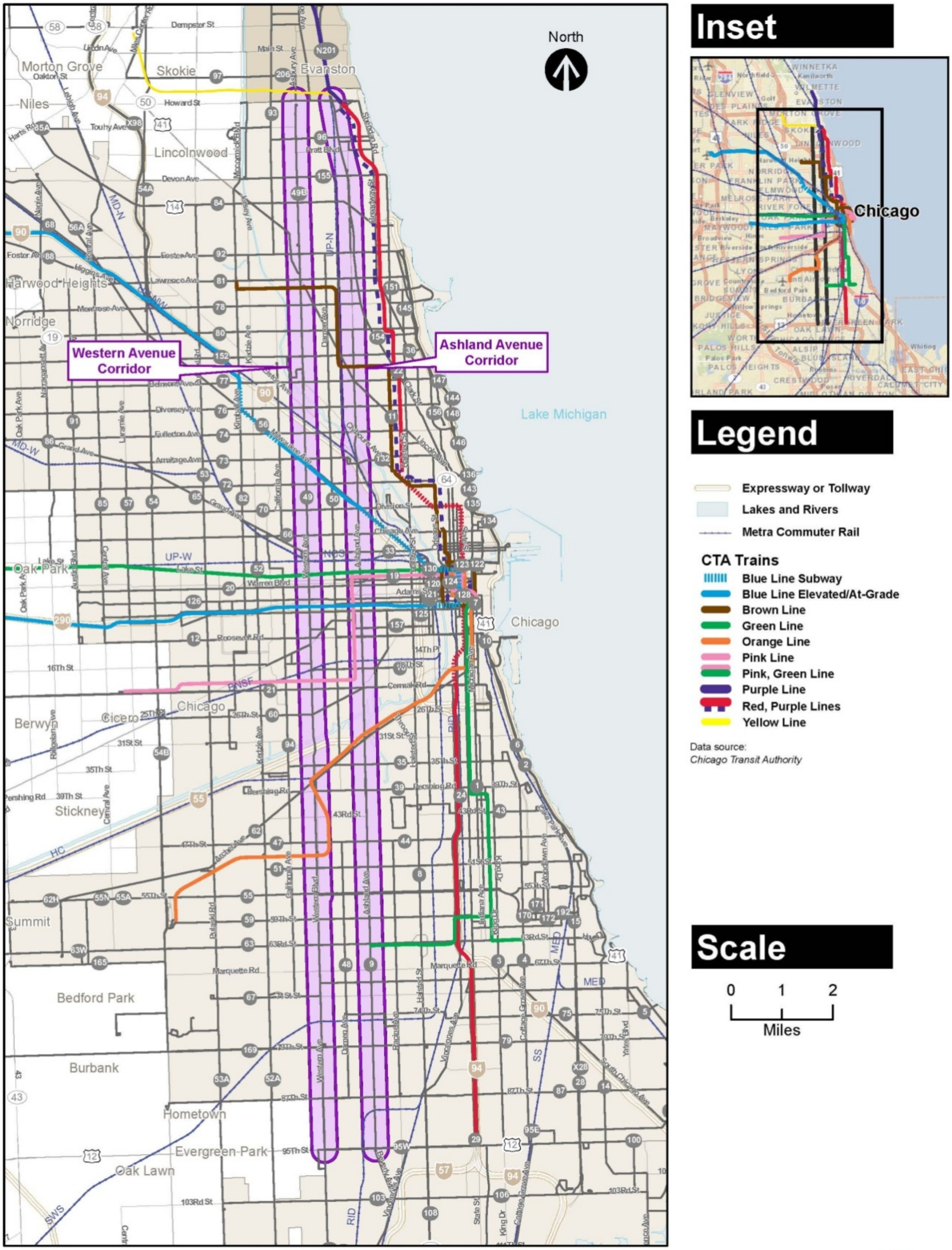
The AA process involves a series of steps in the development of the LPA. As a first step in this process, an existing conditions evaluation was conducted of the corridors to delineate the problems within the corridor and succinctly define the purpose and need for implementation of this project. Further information on the Purpose and Need may be found in the *Purpose and Need Statement Technical Memorandum*. Based on the project purpose and need statements and an engineering and planning analysis, a series of No-Build, Transportation Systems Management (TSM) and Build Alternatives were developed for further screening in the AA.

Because this is a mode specific AA, a two-level alternatives screening process is being conducted. The screen one evaluation, detailed in this report, describes the process and results of a fatal flaw analysis of the universe of BRT alternatives considered. The purpose of this Screen One Alternatives Report is to review the range of alternatives suggested during project scoping and document feasible alternatives to move forward in the screen two evaluation. The screen two evaluation will evaluate feasible alternatives against agreed upon project goals and objectives criteria, and will provide a more detailed assessment of alternatives including a review of potential station locations. The purpose and need, screen one and two analyses, along with community input at key milestones in the project will culminate in a recommended LPA along these corridors.

1.2 Study Area

Located approximately 2.5 and 1.5 miles, respectively, west of Chicago's "Loop" (the central business district), the Western and Ashland Corridors (shown in **Figure 1-1**) span approximately 21 miles each in length.

Figure 1-1: Study Area



Data source:
Chicago Transit Authority

STUDY AREA PROFILE	
Population:	**677,306**
Number Jobs:	**187,400**
Neighborhoods:	**55**
Wards:	**28**
Historic Areas:	**10**

Corridor limits extend along both the Western and Ashland Corridors from Howard Street in the north to 95th Street in the south. For study purposes, the Ashland Avenue alignment transitions to Clark Street near Ridge Avenue (approximately 5800 north), and continues along Clark Street to Howard Street, the northern border of Chicago. Demographic characteristics for all Census tracts within a quarter mile of the Western and Ashland Avenue Corridors as well as all tracts between the two Avenues were used to define the study area and information was analyzed based on most recent 2010 U.S. Census data to identify an existing study area demographic profile. This study area boundary was chosen based on assumed reasonable walking distances to the corridor from surrounding residential areas.

These corridors are home to over 677,000 people (roughly 25 percent of the population of Chicago), over 187,000 jobs, and intersect with 28 of the city's 50 Aldermanic Wards. The area also contains a high transit-dependent population. While over 50 percent of the land use in the study area is high density residential (including single family, multi-family and mixed use), there are also 28 hospitals and several other health and social services in the study area that make up over 40,000 jobs (approximately 21 percent of total jobs in the corridor). Most notably, the large Illinois Medical District is located in the central portion of the study area and serves as an economic cluster of health care jobs in the region.

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Section 2: Initial Considerations and Methodology

2.1 Initial Considerations and Assumptions

This AA will use BRT as the preferred mode and only focus on an evaluation of BRT features within the existing Western and Ashland corridors. BRT is being used as the mode choice because of the system planning efforts conducted to date. The justifications for BRT as the preferred mode and the definition of the Western and Ashland Corridors are summarized below:

- The *Circle Line Alternatives* Analysis Study considered all modes of transit including BRT along Western and Ashland. The Circle Line's Strategic Program of Projects recommended studying BRT along the Western and Ashland Corridors.

- In August 2011 the Metropolitan Planning Council (MPC), in coorperation with CTA and CDOT, completed a study entitled Integrating Livability Principles into Transit Planning: an Assessment of Bus Rapid Transit Opportunities in Chicago. This analysis identified the Western and Ashland Corridors as two of the top ten corridors with the greatest potential for integrating livability principles with BRT.

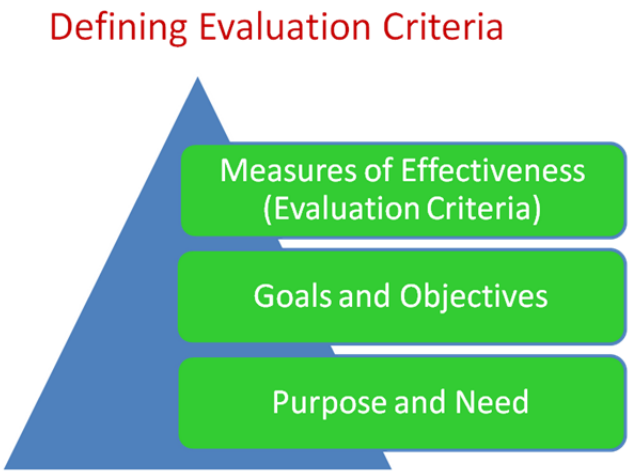
- These two corridors are two of the highest three bus ridership corridors in the CTA system.

- These two corridors have wide rights-of-way therefore providing an opportunity for the application of BRT.

Based on the information above, a grant application was submitted to the FTA to further study BRT applications along the Western and Ashland Corridors. The grant was obtained to complete an AA that would determine the appropriate application of BRT in these corridors. The AA process has been designed to comply with the FTA guidelines for New Starts/Small Starts projects and the National Environmental Policy Act (NEPA).

2.2 Screen One Evaluation Criteria

The screen one criteria represent performance measures for evaluating alternatives, and have been refined through the development of the purpose and need and goals and objectives process, as described below.


Defining Evaluation Criteria
Measures of Effectiveness (Evaluation Criteria)
Goals and Objectives
Purpose and Need

The *Project Purpose and Need* Technical *Memorandum* was developed early on in this AA and includes five strategies that helped define the scope of the project. The five purpose statements developed for this project were defined based on an extensive review of existing conditions as well as from public and stakeholder input to identify the key issues to be addressed through this project, and include the following:

- **Purpose 1** – Strengthen the north-south connections to CTA and Metra's transit network outside of the "loop" thereby improving regional, neighborhood, and job connectivity.
- **Purpose 2** – Provide a high quality transit experience by improving reliability, travel speed and ease of use.
- **Purpose 3** – Provide premium transit solutions that meet city/regional livability and mobility goals.
- **Purpose 4** – Provide premium transit solutions that support transportation, land use and economic development goals.
- **Purpose 5** – Develop premium transit solutions that effectively address both physical and financial constraints.

These project purposes provided the foundation for the development of goals and objectives, as indicated in **Table 2-1** below.

Table 2-1: Project Goals and Objectives

Purpose		Goals and Objectives
1	**Strengthen the non-downtown north-south connections to CTA and Metra's rail network while improving regional, neighborhood and job connectivity.**	Expand Premium Transit Network
		Integrate Local Bus Service with Premium Service
		Design interconnectivity with CTA rail, Metra and bus service
		Improve Pedestrian Access
2	**Provide a high quality bus travel experience by improving reliability, travel speeds and ease of use.**	Improve Transit Speed
		Improve Reliability
		Improve Ride Quality
		Improve Waiting and Boarding Experience
		Improve Pedestrian Safety
3	**Provide a BRT alternative in order to meet city/regional livability and economic goals.**	Improve Pedestrian Experience
		Enhance Integration with Adjacent Land Uses
		Enhance Streetscape
4	**Balance road design with current and future demand for increased capacity along the corridors.**	Enhance Street Identity
		Meets Design Standards
		Use Existing Curb-to-Curb Street Width
		Design For Future Expansion Flexibility
		Enforce bus lane restrictions
		Minimize Impacts to On-Street Parking and Loading
5	**Develop premium transit solutions that effectively address physical and financial constraints.**	Minimize Implementation Time
		Minimize Capital Expense Costs
		Minimize Bus Operating Costs
		Minimize Roadway Maintenance Costs
		Use a Unique, Specialized Dedicated Fleet
		Minimize Construction Duration & Intensity

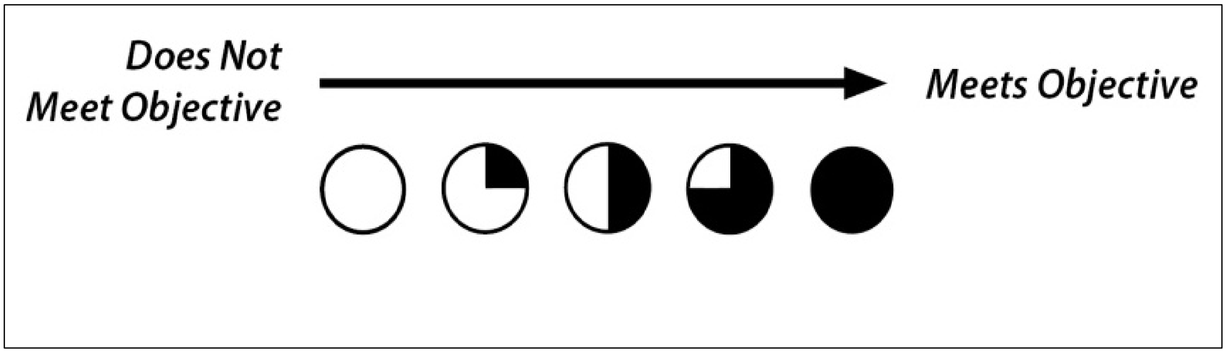
Quantitative evaluation criteria were subsequently developed based upon these larger project purposes and goals and objectives and provide measures of effectiveness in comparing alternatives. It should be noted that the screening criteria do not provide a comprehensive evaluation of alternatives, but rather provide a comparative assessment of benefits and impacts of the alternative's performance. **Table 2-2** presents the screening criteria. Each purpose statement has been more concisely categorized for ease of understanding and evaluation through the rest of this report.

Table 2-2: Screen Criteria

Purpose Category	Screen Criteria	Source Data and Evaluation Method
Transit Network and Performance	Improve transit speed and reliability	Qualitative assessment of conceptual designs
	Provide off-board fare collection	
	Integration with local bus service	Location and separation of bus-only lanes
	Enforceability of bus-only lanes	
Transit Rider Experience	Improve Ride Quality	Qualitative assessment of conceptual designs
	Improve Waiting and Boarding Experience	
Livability, Urban Design and Economic Vitality	Improved pedestrian safety and access	Change in crossing distance; Change in median area.
	Enhance Integration with Adjacent Land Uses, Enhance Street Identity and Enhance Streetscape	Change in sidewalk and median areas; change in pedestrian amenities (trees, parking, etc)
Road Design, Traffic and Parking	Number of general travel lanes	Change in travel lanes
	Meets Design Standards	Comparison with CTA standards and CDOT street design standards and review by CTA/CDOT
	Minimize taking of land for existing Curb-to-Curb Street Width	Change in curb-to-curb street width
	Minimize impacts to On-Street Parking and Loading	Change in parking and loading configuration
Costs and Construction	Minimize Implementation Time	Qualitative assessment of costs and construction (curb relocation, etc)
	Minimize Operating and Capital Costs	
	Minimize Roadway Maintenance Costs	
	Minimize Construction Duration & Intensity	

Since detailed quantification was not undertaken as part of screen one, a comparative matrix was developed that could help identify those alternatives that warranted further analysis. The selected criteria were rated at five levels going from “Does Not Meet Objective” to “Meets Objective”. This is shown in **Figure 2-1**. The comparative assessment of each alternative is summarized in **Section 4** of this report.

Figure 2-1: Alternative Ratings



Section 3: Screen One Alternatives

A series of no-build, transportation systems management (TSM), and build alternatives were developed for the screen one evaluation and are described in detail below. The build alternatives consider a variety of lane configuration designs to accommodate BRT, including curbside bus lanes, center bus lanes, reversible center lane strategies, barrier separated bus lanes, as well as two-way adjacent bus lanes. Some alternatives also consider sidewalk width reductions to accommodate bus lanes, and assume an ability to reduce existing 15-foot sidewalks to 10-foot sidewalks. All alternatives were designed utilizing the existing right-of-way, which is typically 100 feet throughout the corridors. Variations of the 100-foot right-of-way were not assessed in this report and will be considered in the screen two evaluation. Stations are assumed to be at intersections for safety and operational reasons and will be evaluated as part of the screen two evaluation as well.

3.1 No-Build and TSM Alternatives

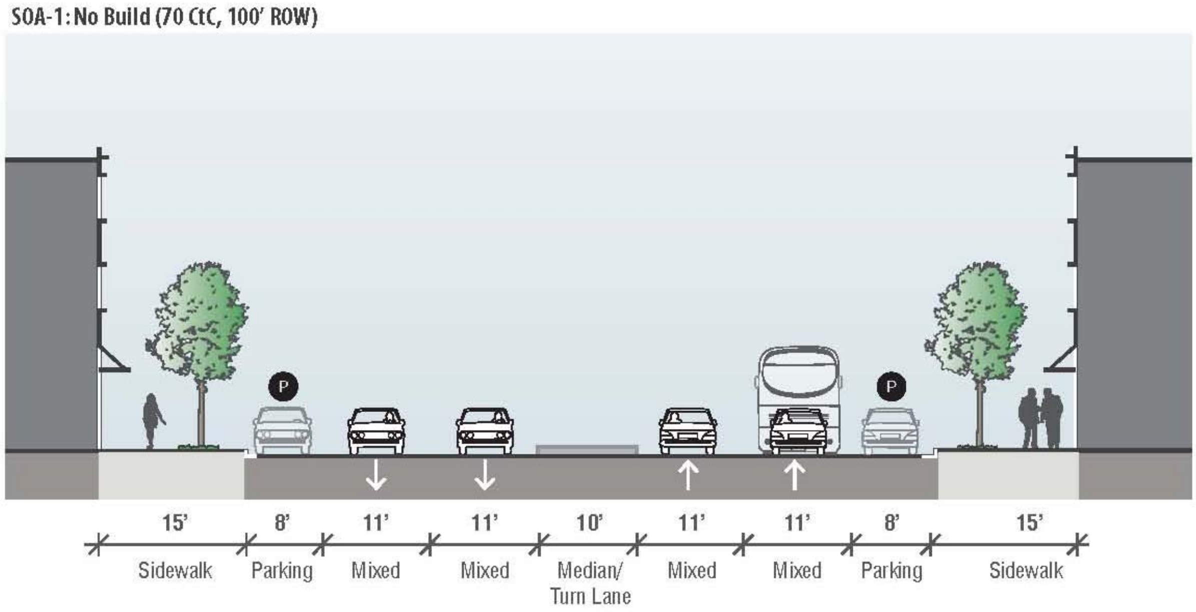
The No-Build and Transportation System Management (TSM) alternatives provide a baseline for comparing Build Alternatives against existing conditions and minimal transit investments within the corridor.

SOA-1A: No-Build Alternative

The No-Build Alternative consists of the existing street configuration and bus service. The No-Build Alternative will automatically carry over for evaluation in the screen two analysis and the subsequent environmental process.

SOA-1B: TSM Alternative

The TSM Alternative will consist of the existing street configuration and will consider implementation of express bus service without exclusive travel lanes. The TSM Alternative will automatically carry forward for evaluation in the screen two analysis.



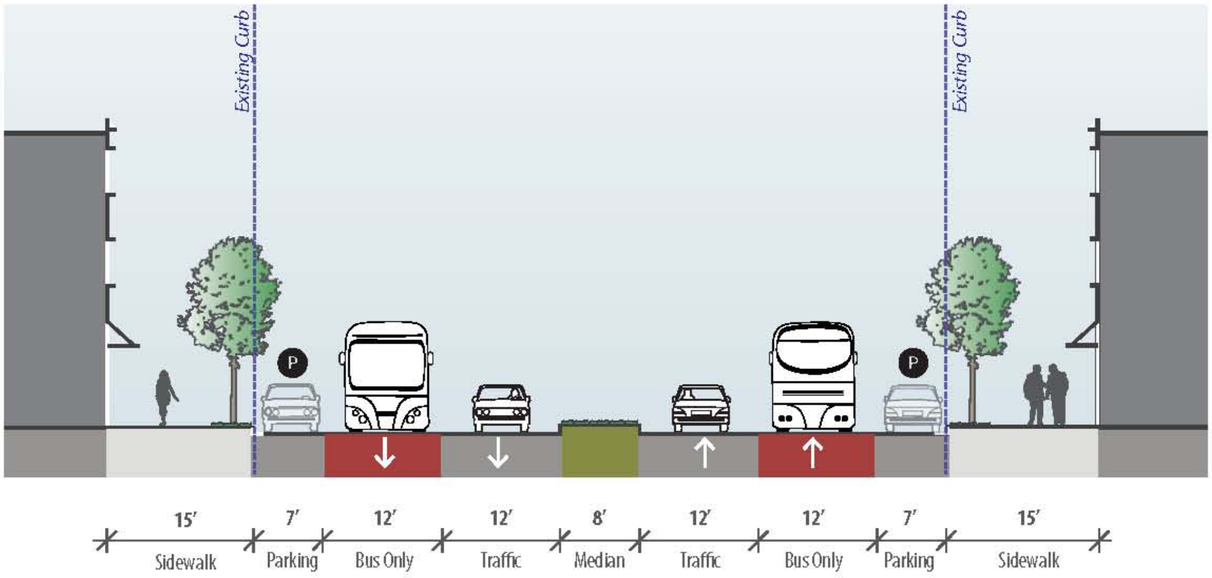
3.2 Build Alternatives

The following represents the series of potential build alternatives evaluated as part of the screen one evaluation process. All Build Alternatives utilize a combination of existing travel lanes, on-street parking, and/or existing sidewalk widths. The distinct Build Alternatives utilize these features to provide options for improving bus travel and safe operations.

SOA-2: BRT Curbside Bus Lanes, Remove Travel Lanes

This BRT alternative includes one curbside bus lane in each direction, one travel lane in each direction, parking, and a slightly reduced median. One travel lane is removed in each direction to accommodate bus lanes, but existing parking and sidewalk widths are preserved. A median is provided between lanes for safety reasons. The bus lane for this alternative includes colored pavement and "Bus Only" markings. Mixed traffic will be discouraged from entering the bus lane, but because the bus lanes are located on the curbside lane, cars are allowed to cross the lanes to access parallel parking and make right turns.

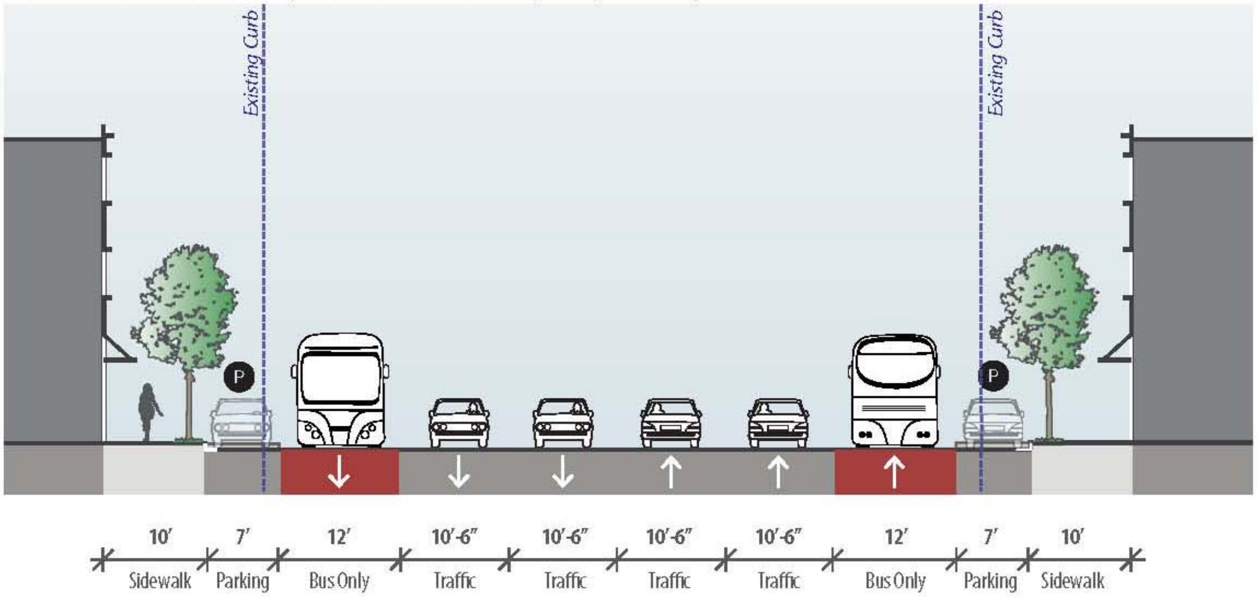
SOA-2: BRT Curbside Bus Lanes, Remove Travel Lanes (70 CtC, 100′ ROW)



SOA-3: BRT Curbside Bus Lanes, Reduce Sidewalk Width, Remove Median

This BRT alternative includes one curbside bus lane in each direction, two travel lanes in each direction, and parking. Sidewalk width would be reduced to accommodate bus lanes and the center median/turn-lane would be removed, while parking and travel lanes are preserved. The bus lane will include colored pavement and "Bus Only" markings. Mixed traffic will be discouraged from entering the bus lane, but because the bus lanes are located on the curbside lane, cars are allowed to cross the lanes to access parallel parking and make right turns.

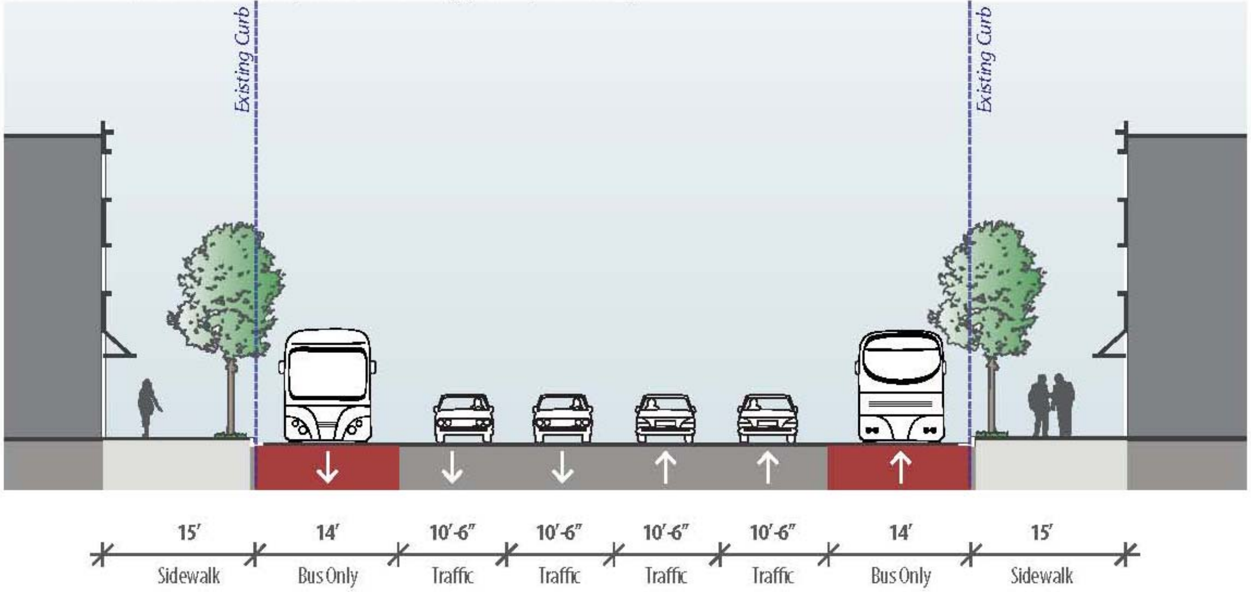
SOA-3: BRT Curbside bus lanes, Reduce Sidewalk Width (80 CtC, 100' ROW)



SOA-4: BRT Curbside Bus Lanes, Remove Parking and Median

This BRT alternative includes one curbside bus lane and two travel lanes in each direction. Parking and the existing median would be removed to accommodate bus lanes, while travel lanes and sidewalk widths are preserved. The bus lane for this alternative would include colored pavement and "Bus Only" markings. Mixed traffic will be discouraged from entering the bus lane, but because the bus lanes are located on the curbside lane, cars are allowed to cross the lanes to access parallel parking and make right turns.

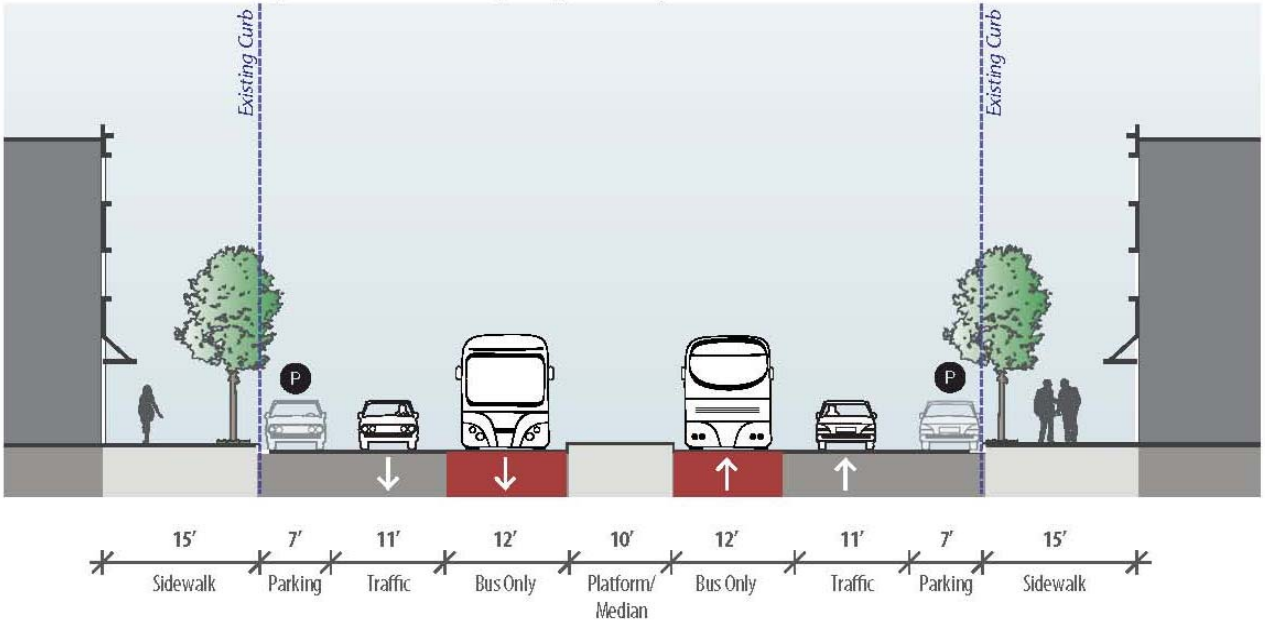
SOA-4: BRT Curbside Bus Lanes, Remove Parking (70 CtC, 100' ROW)



SOA-5: BRT Center Bus Lanes, Remove Travel Lanes

This BRT alternative includes one center bus lane in each direction, one travel lane in each direction, parking, and a median. One travel lane is removed in each direction to accommodate bus lanes, but parking and sidewalk widths are preserved. The bus lane for this alternative includes colored pavement and "Bus Only" markings.

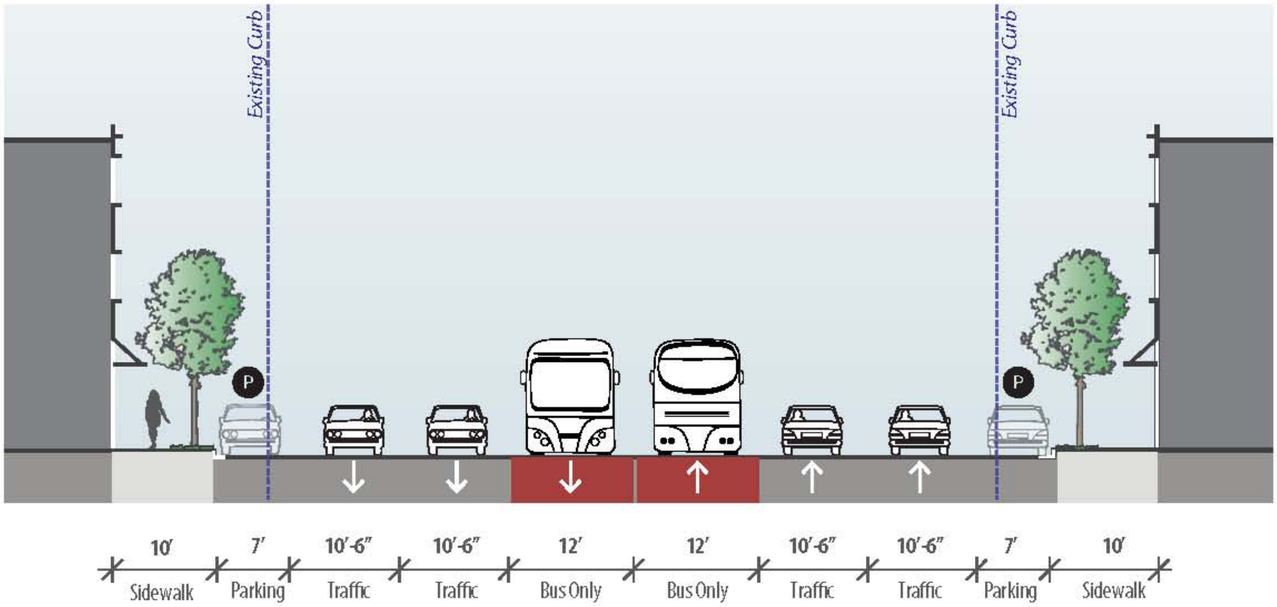
SOA-5: BRT Center Bus Lanes, Remove Travel Lanes (70 CtC, 100′ ROW)



SOA-6: BRT Center Bus Lanes, Reduce Sidewalk Width

This BRT alternative includes one center bus lane in each direction, two travel lanes in each direction and parking. Sidewalk width is reduced to accommodate bus lanes and the center median/turn lane would be removed, while parking and travel lanes are preserved. The bus lane for this alternative will include colored pavement and "Bus Only" markings.

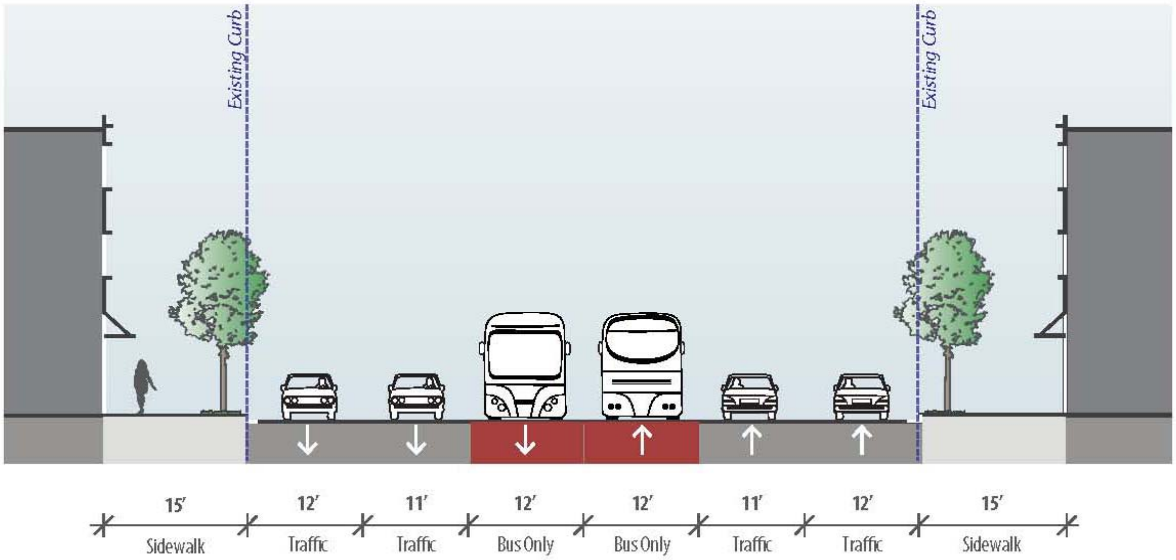
SOA-6: BRT Center Bus Lanes, Reduce Sidewalk Width (80 CtC, 100′ ROW)



SOA-7: BRT Center Bus Lanes, Remove Parking

This BRT alternative includes one center bus lane and two travel lanes in each direction. Parking and the center median/turn-lane would be removed to accommodate bus lanes, while travel lanes and sidewalk widths are preserved. The bus lane for this alternative would include colored pavement and "Bus Only" markings.

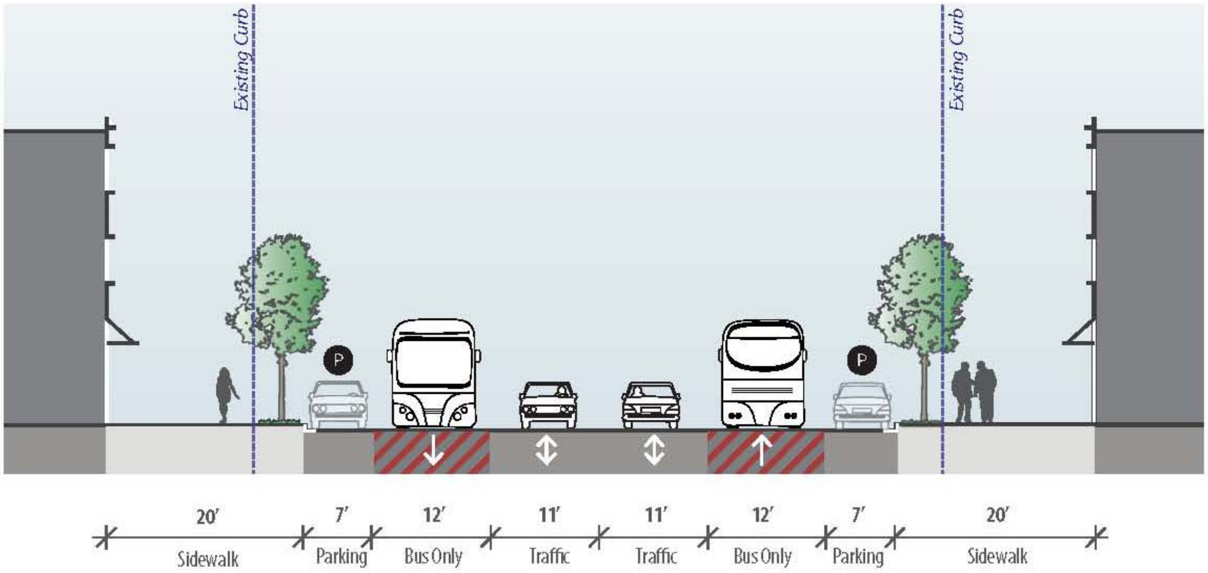
SOA-7: BRT Center Bus Lanes, Remove Parking (70 CtC, 100′ ROW)



SOA-8: Peak Period Bus Lane in Peak Direction

This is one of four potential alternatives (SOA-8 through SOA-11) where a reversible center lane could be utilized either for a travel lane or bus lane. This alternative would accommodate a bus lane and two travel lanes in the peak direction and would include a peak period bus lane in peak direction (two travel lanes in peak direction, one travel lane off peak direction, and parking, requires overhead reversible lane signs).

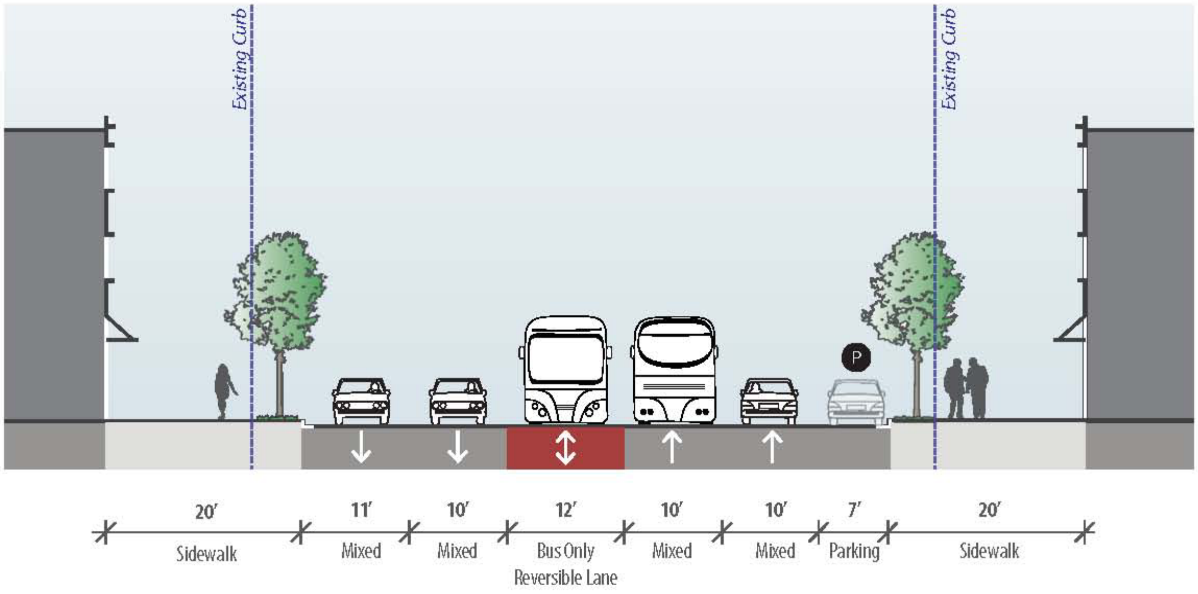
SOA-8: BRT Peak period bus lane in peak direction (60 CtC, 100′ ROW)



SOA-9: Reversible Bus Lane for Peak Direction

This is one of four potential alternatives (SOA-8 through SOA-11) where a reversible center lane could be utilized either for a travel lane or bus lane. This alternative would accommodate a bus lane and two travel lanes in the peak direction and would include a reversible bus lane for peak direction (two travel lanes in each direction, and one lane of parking).

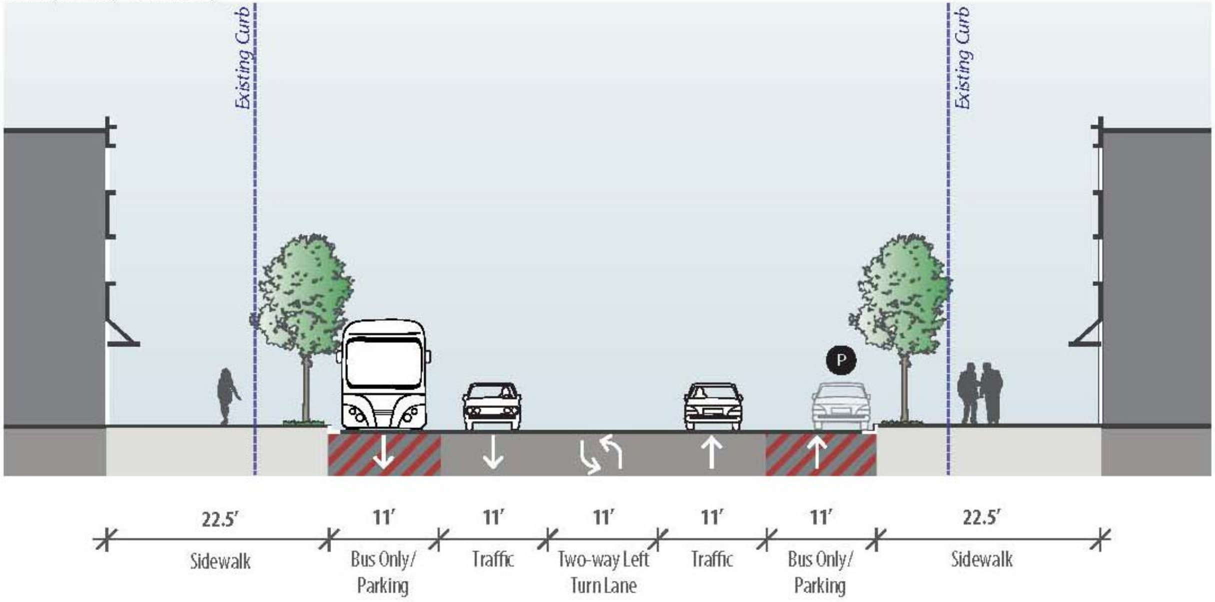
SOA-9: Reversible bus lane for peak direction (60 CtC, 100′ ROW)



SOA-10: Bus Lane for Peak Direction (parking off-peak), One Travel Lane in Each Direction and a Two-Way Left Turn

This is one of four potential alternatives (SOA-8 through SOA-11) where a reversible center lane could be utilized either for a travel lane or bus lane. This alternative would accommodate a bus lane and two travel lanes in the peak direction and would include a bus lane for peak direction (parking off peak) one travel lane in each direction, and a two-way left-turn lane.

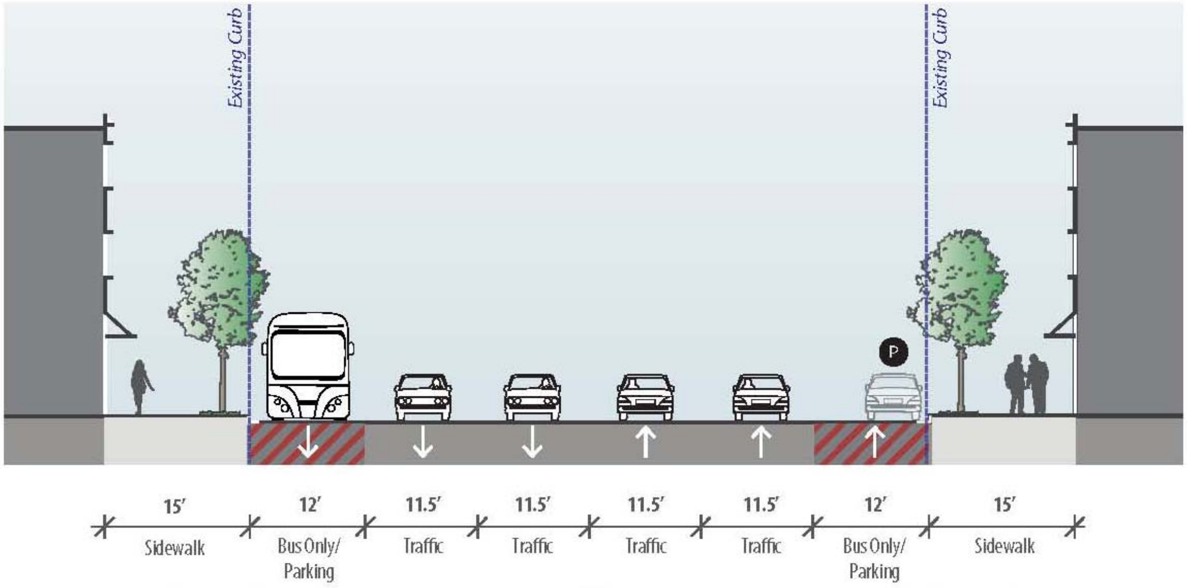
SOA-10: Bus lane for peak direction (parking off peak) one travel lane in each direction, and a two-way left-turn lane (55 CtC, 100′ ROW)



SOA-11: Bus Lane for Peak Direction (parking off-peak), Two Travel Lanes in Each Direction

This is one of four potential alternatives (SOA-8 through SOA-11) where a reversible center lane could be utilized either for a travel lane or bus lane. This alternative would accommodate a bus lane and two travel lanes in the peak direction and would include a bus lane for peak direction (parking off peak) and two travel lanes in each direction.

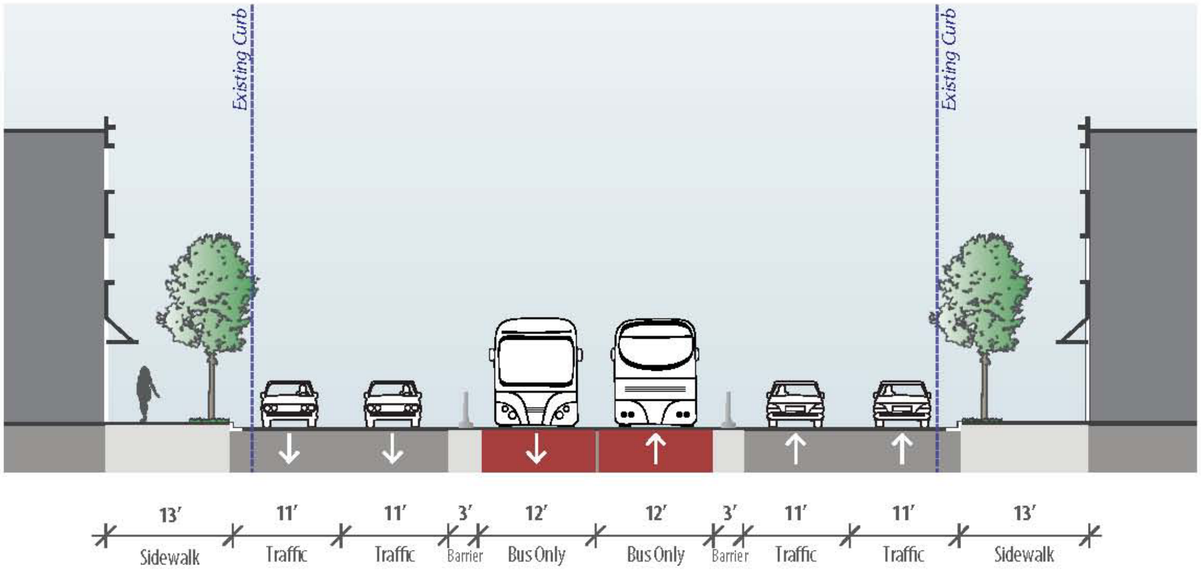
SOA-11: Bus lane for peak direction (parking off peak) and two travel lanes in each direction (70 CtC, 100′ ROW)



SOA-12: Separated Center Bus Lanes and Two Travel Lanes in Each Direction

This alternative is one of three potential alternatives (SOA-12 through SOA-14) that include barrier separated bus lanes. These alternatives all include bus lanes with physical separation from travel lanes, such as concrete barrier, mountable curbs or flexible posts. In this alternative, separated center bus lanes and two travel lanes would be provided in each direction.

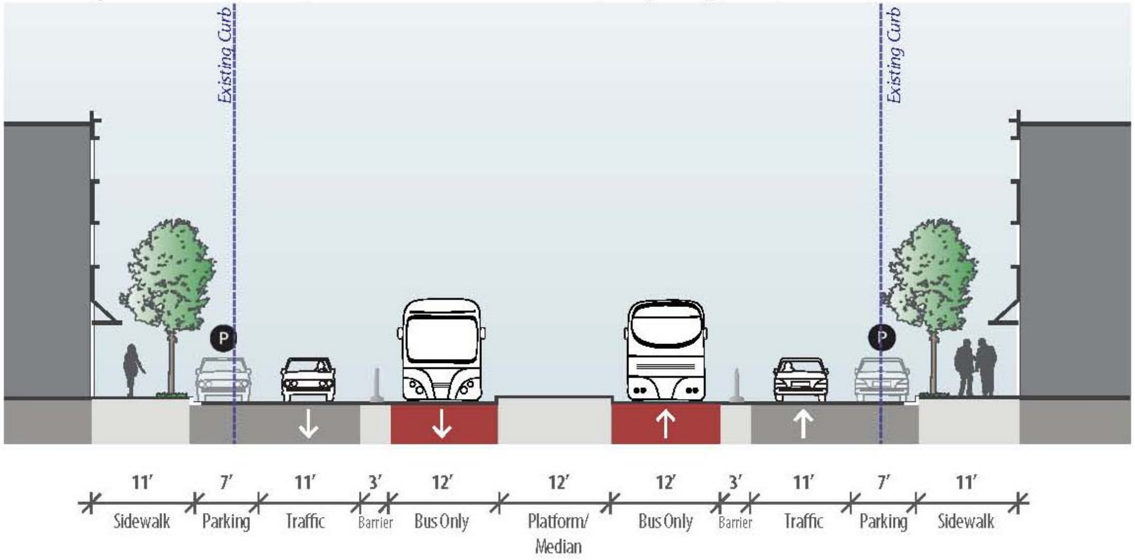
SOA-12: Separated center bus lanes and two travel lanes in each direction (74 CtC, 100′ ROW)



SOA-13: Separated Center Bus Lanes, One Travel Lane in Each Direction and Parking

This alternative is one of three potential alternatives (SOA-12 through SOA-14) that include barrier separated bus lanes. These alternatives all include bus lanes with physical separation from travel lanes, such as concrete barrier, mountable curbs or flexible posts. In this alternative, separated center bus lanes, one travel lane in each direction, and parking would be provided.

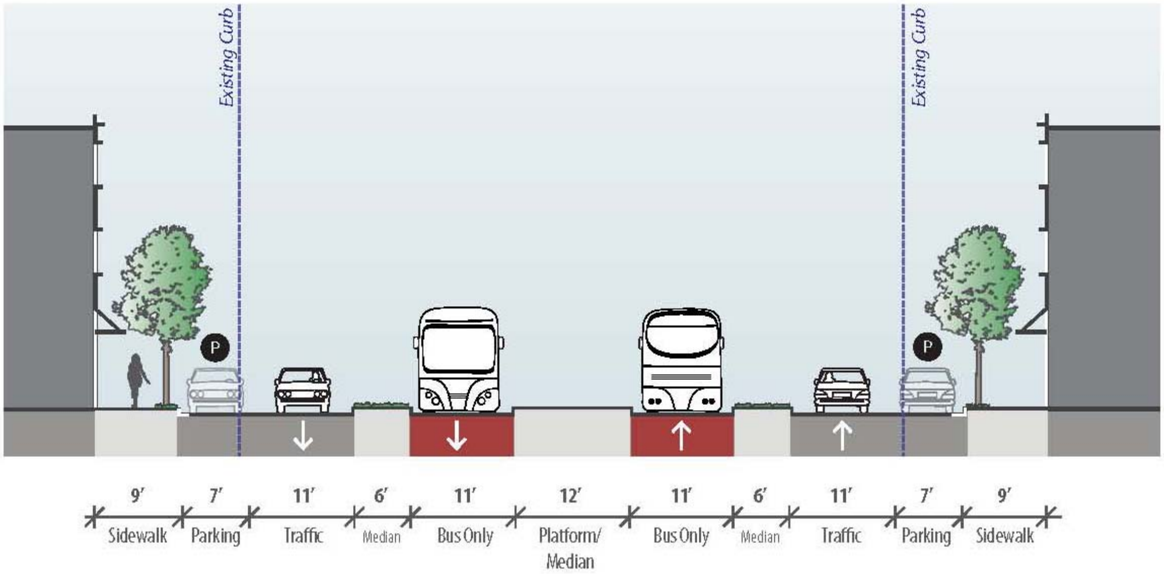
SOA-13: Separated center bus lanes, one travel lanes in each direction, and parking (78 CtC, 100′ ROW)



SOA-14: Median Separated Center Bus Lanes with Platform, One Travel Lane in Each Direction, and Parking

This alternative is one of three potential alternatives (SOA-12 through SOA-14) that include barrier separated bus lanes. These alternatives all include bus lanes with physical separation from travel lanes, such as concrete barrier, mountable curbs or flexible posts. In this alternative, median separated center bus lanes with a platform would be provided and one travel lane in each direction with parking would be provided.

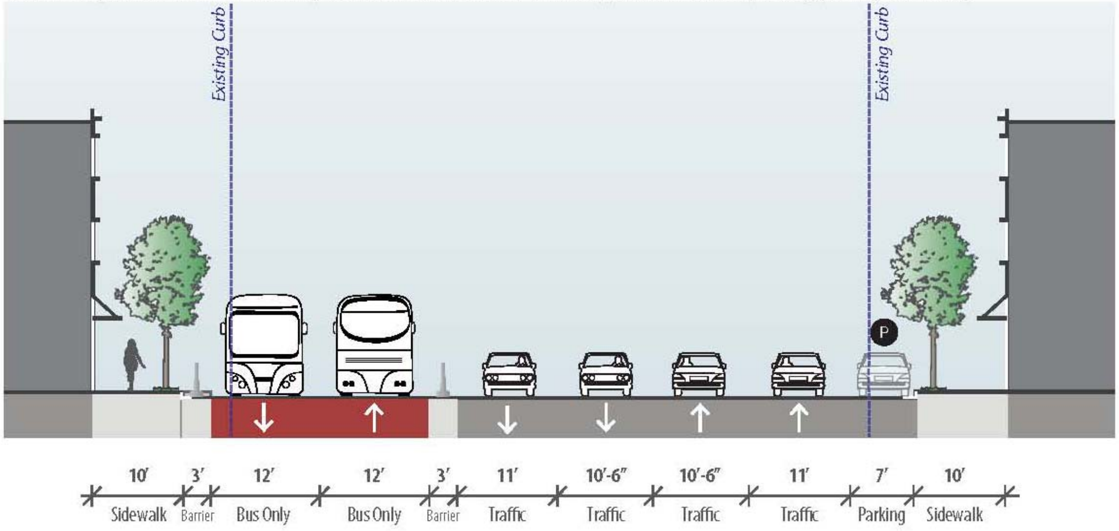
SOA-14: Median separated center bus lanes with platform, one travel lane in each direction, and parking (82 CtC, 100′ ROW)



SOA-15: Separated Outside Bus Lanes, Two Travel Lanes in Each Direction, and One Lane of Parking

This is one of two potential alternatives (SOA-15 through SOA-16) that includes a two-way adjacent bus lane. In both alternatives, a two-way bus lane runs adjacent to travel lanes. This alternative includes separated outside bus lanes, two travel lanes in each direction, and one lane of parking. This alternative would require reducing existing sidewalk widths to accommodate the two-way adjacent bus lanes.

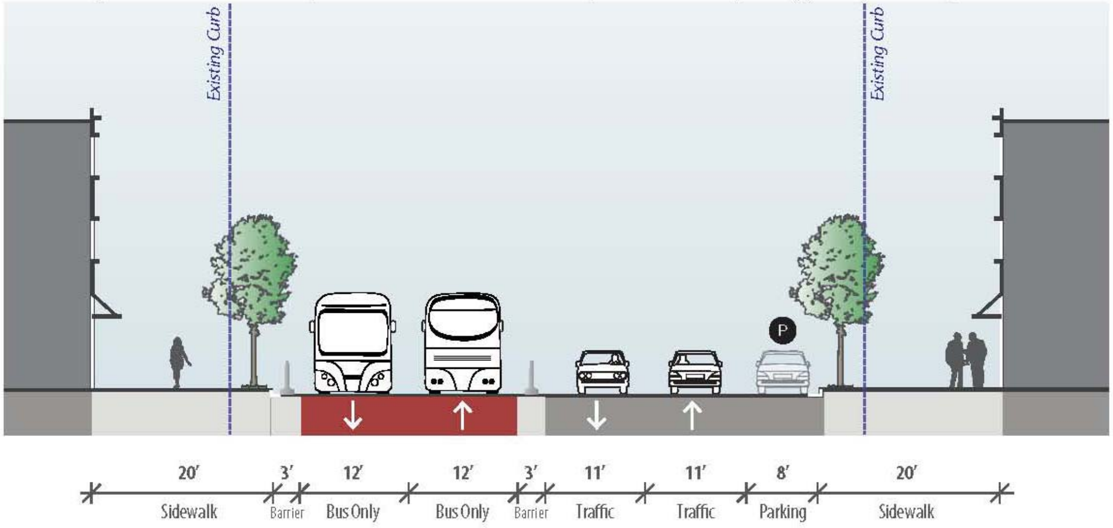
SOA-15: Separated outside bus lanes, two travel lanes in each direction, and one lane of parking (80 CtC, 100′ ROW)



SOA-16: Separated Outside Bus Lanes, One Travel Lane in Each Direction, and One Lane of Parking

This is one of two potential alternatives (SOA-15 through SOA-16) that includes a two-way adjacent bus lane. In both alternatives, a two-way bus lane runs adjacent to travel lanes. This alternative includes separated outside bus lanes, one travel lane in each direction, and one lane of parking. The configuration of two-way adjacent bus lanes may create operational complexity at intersections and stop locations, especially where automobile traffic turns across the two-way bus lanes.

SOA-16: Separated outside bus lanes, one travel lane in each direction, and one lane of parking (60 CtC, 100′ ROW)



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Section 4: Screen One Alternatives Evaluation

The following provides an overview of the results of the screen one alternatives evaluation.. The results of this screen one evaluation are described below in Sections 4.1 and 4.2 and are summarized in Appendix A.

4.1 Alternatives – Not Recommended to Advance

In conducting the screen one evaluation, alternatives were screened for fatal flaws. Alternatives determined to be infeasible due to transit operational issues, design considerations, or cost are not recommended for further evaluation and are described in detail below. These fatal flaw alternatives included reversible lane, barrier separated and two-way adjacent bus lane options.

Reversible Lane/Peak Direction Alternatives (SOA-8 through SOA-11)

There are four potential alternatives where a reversible center lane is utilized either for a travel lane or bus lane. Reversible lanes are not appropriate on the Western and Ashland corridors because there is not a dominant direction during peak travel periods. Furthermore, this would increase costs significantly because of the need for overhead lane control signs and a lane control systems. This practice is also not endorsed by either the Chicago Department of Transportation (CDOT) or CTA. For these reasons, reversible lane alternatives are not recommended for further consideration.

Alternatives removed from consideration include:

- **SOA-8**: Peak period bus lane in peak direction, two travel lanes in peak direction, one travel lane off peak direction, and parking (requires overhead reversible lane signs) (60' CtC, 100’ ROW)
- **SOA-9**: Reversible bus lane for peak direction, two travel lanes in each direction, and one lane of parking (60' CtC, 100’ ROW)
- **SOA-10**: Bus lane for peak direction (parking off peak), one travel lane in each direction, and a two-way left-turn lane (55' CtC, 100’ ROW)
- **SOA-11**: Bus lane for peak direction (parking off peak) and two travel lanes in each direction (70' CtC, 100’ ROW)

Barrier Separated Alternatives (SOA-12 through SOA-14)

There are three potential alternatives that include barrier separated bus lanes. It was determined that physically separated lanes do not conform to the urbanized, mixed-use context CDOT and CTA are trying to achieve. From an urban design standpoint, concrete barriers would reduce community cohesion and the perceived safety and walkability of the surrounding area.. These barriers also prevent buses from moving around stalled vehicles. Additionally, these separations restrict emergency access to the area. For these reasons, these alternatives are not recommended for further consideration.

Alternatives removed from consideration include:

- **SOA-12**: Separated center bus lanes and two travel lanes in each direction (74' CtC, 100’ ROW)

- **SOA-13**: Separated center bus lanes, one travel lanes in each direction, and parking (78' CtC, 100’ ROW)
- **SOA-14**: Median separated center bus lanes with platform, one travel lane in each direction, and parking (82' CtC, 100’ ROW)

It should be noted that this does not preclude some form of surface treatment to indicate a separate lane such as rumble strips, different stripping, etc.

Two-way Adjacent Bus Lane Alternatives (SOA-15 through SOA-16)

There are two potential alternatives that include a two-way adjacent bus lane. This configuration creates operational difficulties at intersections and stop locations, especially in loading zones and where automobile traffic turns across the two-way bus lanes. Furthermore, this design creates a barrier for loading and unloading on one side of the street. For these reasons, these alternatives are not recommended for further consideration.

Alternatives removed from consideration include:

- **SOA-15:** Separated outside bus lanes, two travel lanes in each direction, and one lane of parking (80' CtC, 100’ ROW)
- **SOA-16**: Separated outside bus lanes, one travel lane in each direction, and one lane of parking (60' CtC, 100’ ROW)

4.2 Alternatives – Recommended for Further Evaluation

SOA-2: BRT Curb Side Bus Lanes, Remove Travel Lanes

Transit Performance

Dedicated bus lanes would improve transit speed and reliability because buses do not intermix with through traffic. Furthermore, the BRT system would provide the opportunity for off-board fare collection, which would allow for all-door boarding helping reduce dwell times and improve the transit rider's waiting and boarding experience. Because of the location of bus-only lanes along the curb, enforceability of bus-only lanes may be somewhat impeded by cars completing right turns from the bus-only lanes. Local buses would be able to utilize bus only lanes and local stops would remain in the same locations. BRT travel speeds would be impacted by parking spaces and loading zones and interaction with the local bus services.

Transit Rider Experience

Pedestrian safety improvements, such as curb extensions and increased landscaping would be provided. BRT stations would be of high-quality design and may have additional amenities, such as bicycle parking and real-time information to improve the transit rider experience.

Urban Design

Pedestrian access and street identity would be improved by integrating streetscape enhancements including a median to be utilized for additional landscaping and as a pedestrian refuge.

Traffic and Parking

Traffic capacity may be reduced by the removal of travel lanes. Parking would continue to be located along the corridor.

Costs Considerations

The screen one evaluation of capital costs were established based on whether alternatives could be accommodated within existing curb-to-curb widths since these alternatives represent the most financially feasible options for improvement. The subsequent screen two evaluation will provide greater quantitative comparisons for evaluating capital costs for each alternative. Based on this screen one evaluation of costs, this alternative was determined to be more cost effective than other alternatives because existing curb-to-curb width would be retained.

SOA-3: BRT Curbside bus lanes, Reduce Sidewalk Width

Transit Performance

Dedicated bus lanes would improve transit speed and reliability because buses do not intermix with through traffic. Furthermore, the BRT system would provide the opportunity for off-board fare collection, which would allow for all-door boarding helping reduce dwell times and improve the transit rider's waiting and boarding experience. Local buses would be able to utilize bus only lanes and local stops would remain in the same locations. BRT travel speeds would be impacted by parking spaces and loading zones and interaction with the local bus services.

Transit Rider Experience

Pedestrian safety improvements, such as curb extensions and increased landscaping, would be provided. BRT stations would be of high-quality design and may have additional amenities, such as bicycle parking and real-time information. With the reduction in sidewalk widths to accommodate parking, the areas between stations may not be as pedestrian friendly as current conditions.

Urban Design

The identity of the street would be improved with streetscape enhancements. However, reduced sidewalk width may limit space for pedestrian amenities. Also, depending on how intersections are designed, there may be increased crossing distance at crosswalks.

Traffic and Parking

By reducing sidewalk widths to accommodate the bus lanes, traffic capacity and parking would be retained.

Costs Considerations

The screen one evaluation of capital costs were established based on whether alternatives could be accommodated within existing curb-to-curb widths since these alternatives represent the most financially feasible options for improvement. The subsequent screen two evaluation will provide greater quantitative comparisons for evaluating capital costs for each alternative. Based on this screen one evaluation of costs, this alternative was determined to be less cost effective than other alternatives because existing curb-to-curb width would need to be widened.

SOA-4: BRT Curbside Bus Lanes, Remove Parking

Transit Performance

Dedicated bus lanes would improve transit speed and reliability because buses do not intermix with through traffic. Furthermore, the BRT system would provide the opportunity for off-board fare collection, which would allow for all-door boarding helping reduce dwell times and improve the transit rider's waiting and boarding experience. Local buses would be able to utilize bus only lanes and local stops would remain in the same locations. BRT travel speeds would be impacted by the interaction with the local bus services.

Transit Rider Experience

Pedestrian safety improvements, such as increased landscaping would be provided. BRT stations would be of high-quality design and may have additional amenities, such as bicycle parking and real-time information.

Urban Design

Streetscape enhancements, such as landscaping and pedestrian amenities, would improve the identity of the street. However, on-street parking, which is proposed to be removed in this alternative, is an inherent element of walkable, compact, mixed-use urban areas and a component of economic health of urban businesses.

Furthermore, while sidewalk width would be retained in this alternative, pedestrian comfort and access may still be adversely impacted for several reasons, including:

- Pedestrians would need to cross six travel lanes without a median.
- On-street parking, which improves pedestrian comfort because it acts as a buffer between moving traffic and the sidewalk, is removed.
- On-street parking, which also acts as a buffer for pedestrians and businesses, is removed.
- Removal of on-street parking may encourage faster moving traffic (parking provides an indication to motorists that operating speeds are reduced).

Traffic and Parking

Parking and loading zones would be removed. Traffic capacity would be retained and may improve without potential conflicts with parking cars.

Costs Considerations

The screen one evaluation of capital costs were established based on whether alternatives could be accommodated within existing curb-to-curb widths since these alternatives represent the most financially feasible options for improvement. The subsequent screen two evaluation will provide greater quantitative comparisons for evaluating capital costs for each alternative. Based on this screen one evaluation of costs, this alternative was determined to be more cost effective than other alternatives because existing curb-to-curb width would be retained.

SOA-5: BRT Center Bus Lanes, Remove Travel Lanes

Transit Performance

Dedicated bus lanes would improve transit speed and reliability because buses do not intermix with through traffic. Furthermore, the BRT system would provide the opportunity for off-board fare collection, which would allow for all-door boarding helping reduce dwell times and improve the transit rider's waiting and boarding experience. Local buses would not be able to use bus only lanes.

Transit Rider Experience

Pedestrian safety improvements, such as curb extensions and increased landscaping would be provided. BRT stations would be of high-quality design and may have additional amenities, such as bicycle parking and real-time information.

Urban Design

Pedestrian access and street identity would be improved by integrating streetscape enhancements including a median to be utilized for bus shelters, landscaping and as a pedestrian refuge.

Traffic and Parking

Traffic capacity may be reduced by the removal of travel lanes. Parking would continue to be located along the corridor.

Costs Considerations

The screen one evaluation of capital costs were established based on whether alternatives could be accommodated within existing curb-to-curb widths since these alternatives represent the most financially feasible options for improvement. The subsequent screen two evaluation will provide greater quantitative comparisons for evaluating capital costs for each alternative. Based on this screen one evaluation of costs, this alternative was determined to be more cost effective than other alternatives because existing curb-to-curb width would be retained.

SOA-6: BRT Center Bus Lanes, Reduce Sidewalk Width (80' CtC, 100' ROW)

Transit Performance

Dedicated bus lanes would improve transit speed and reliability because buses do not intermix with through traffic. Furthermore, the BRT system would provide the opportunity for off-board fare collection, which would allow for all-door boarding helping reduce dwell times and improve the transit rider's waiting and boarding experience. Local buses would not be able to use bus only lanes.

Transit Rider Experience

Pedestrian safety improvements, such as curb extensions, increased landscaping would be provided. BRT stations would be of high-quality design and may have additional amenities, such as bicycle parking and real-time information.

Urban Design

The identity of the street would be improved with streetscape enhancements. However, reduced sidewalk width may limit space for pedestrian amenities. Also, depending on how intersections are designed, there may be increased crossing distance at crosswalks.

Traffic and Parking

Traffic capacity and parking would be retained.

Costs Considerations

The screen one evaluation of capital costs were established based on whether alternatives could be accommodated within existing curb-to-curb widths since these alternatives represent the most financially feasible options for improvement. The subsequent screen two evaluation will provide greater quantitative comparisons for evaluating capital costs for each alternative. Based on this screen one evaluation of costs, this alternative was determined to be less cost effective than other alternatives because existing curb-to-curb width would be widened.

SOA-7: BRT Center Bus Lanes, Remove Parking

Transit Performance

Dedicated bus lanes would improve transit speed and reliability because buses do not intermix with through traffic. Furthermore, the BRT system would provide the opportunity for off-board fare collection, which would allow for all-door boarding helping reduce dwell times and improve the transit rider's waiting and boarding experience. Local buses would not be able to use bus only lanes.

Transit Rider Experience

Pedestrian safety improvements, such as increased landscaping would be provided. BRT stations would be of high-quality design and may have additional amenities, such as bicycle parking and real-time information.

Urban Design

Streetscape enhancements, such as landscaping and pedestrian amenities, would improve the identity of the street. However, on-street parking, which is proposed to be removed in this alternative, is an inherent element of walkable, compact, mixed-use urban areas and a component of economic health of urban businesses.

Furthermore, while sidewalk width would be retained in this alternative, pedestrian comfort and access may still be adversely impacted for several reasons, including:

- Pedestrians would need to cross six travel lanes without a median.
- On-street parking, which improves pedestrian comfort because it acts as a buffer between moving traffic and the sidewalk, is removed.
- On-street parking, which also acts as a buffer for pedestrians and businesses, is removed.

- Removal of on-street parking may encourage faster moving traffic (parking provides an indication to motorists that operating speeds are reduced).

Traffic and Parking

Parking and loading zones would be removed. Traffic capacity would be retained and may improve without potential conflicts with parking cars.

Costs Considerations

The screen one evaluation of capital costs were established based on whether alternatives could be accommodated within existing curb-to-curb widths since these alternatives represent the most financially feasible options for improvement. The subsequent screen two evaluation will provide greater quantitative comparisons for evaluating capital costs for each alternative. Based on this screen one evaluation of costs, this alternative was determined to be more cost effective than other alternatives because existing curb-to-curb width would be retained.

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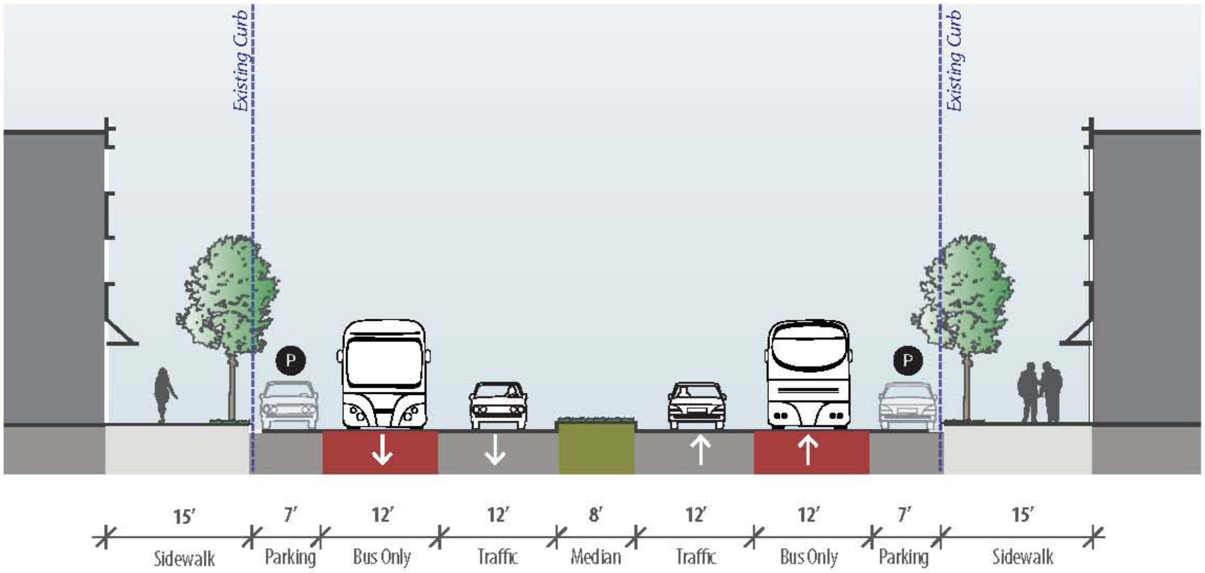
Section 5: Conclusions and Next Steps

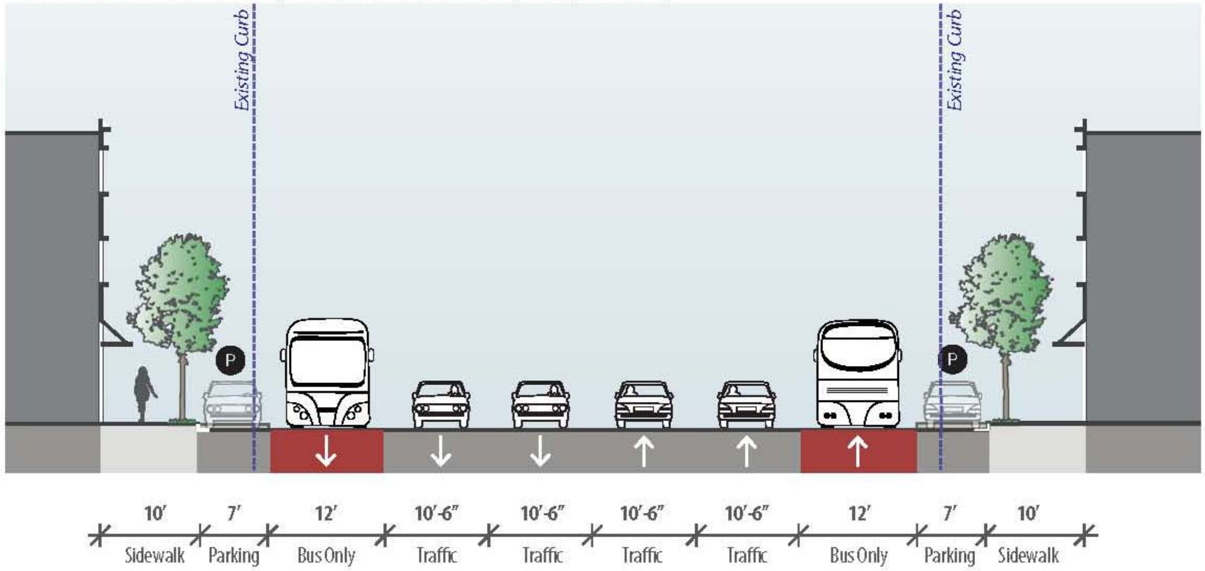
Based upon the screen one evaluation, six Build alternatives are recommended to move forward for further screening and evaluation in the screen two alternatives evaluation. These include the SOA-2 through SOA-7 alternatives. In addition, the No-Build and TSM alternatives will be retained for the screen two evaluation as well.

Figure 5-1: Screen One Build Alternative Recommendations

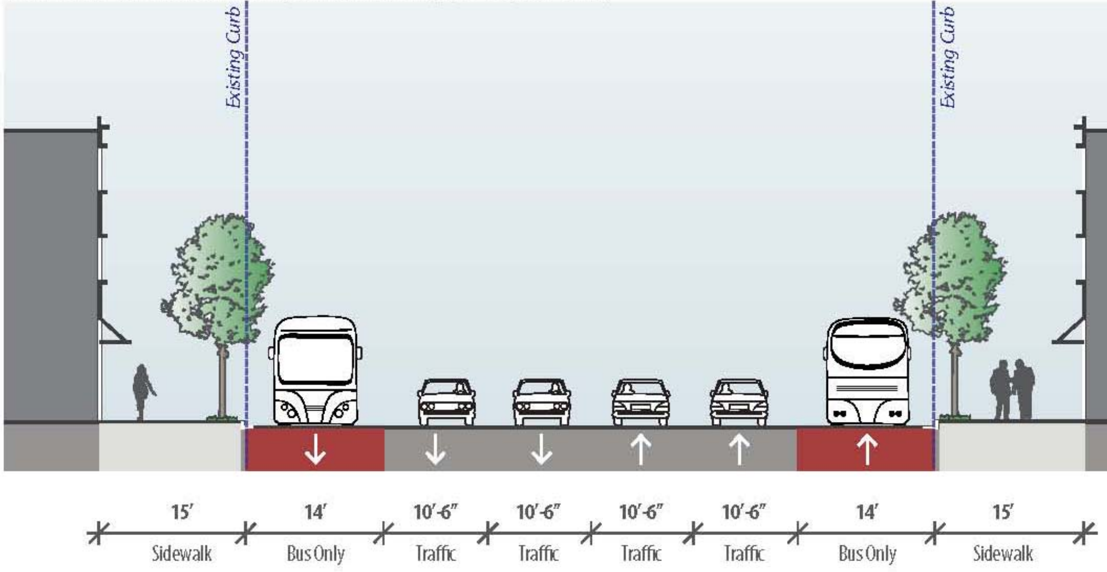
SOA-2: BRT Curbside Bus Lanes, Remove Travel Lanes (70 CtC, 100′ ROW)



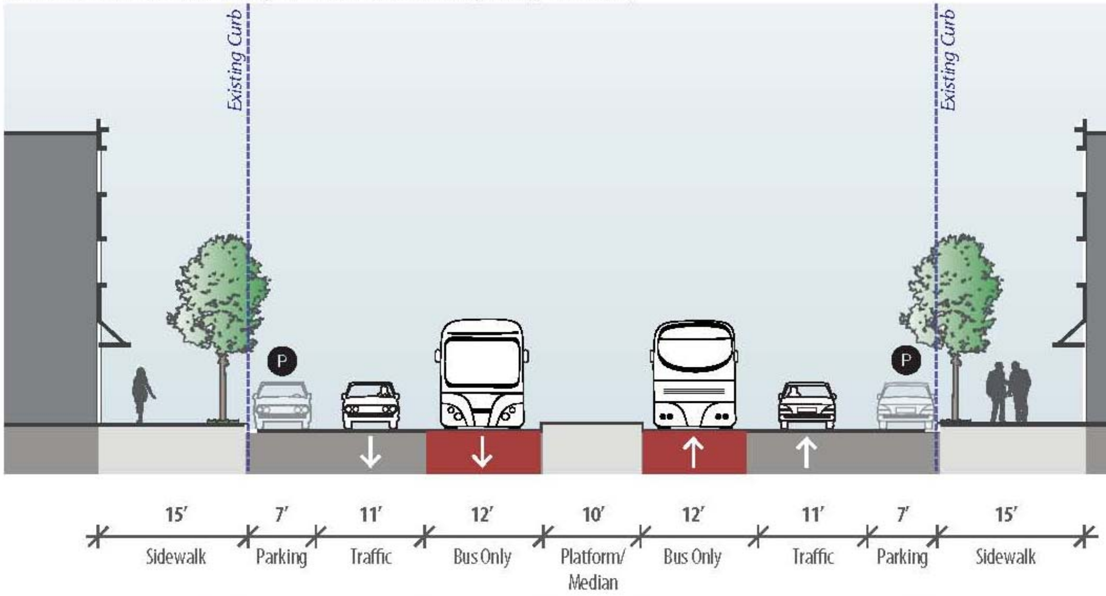
SOA-3: BRT Curbside bus lanes, Reduce Sidewalk Width (80 CtC, 100′ ROW)



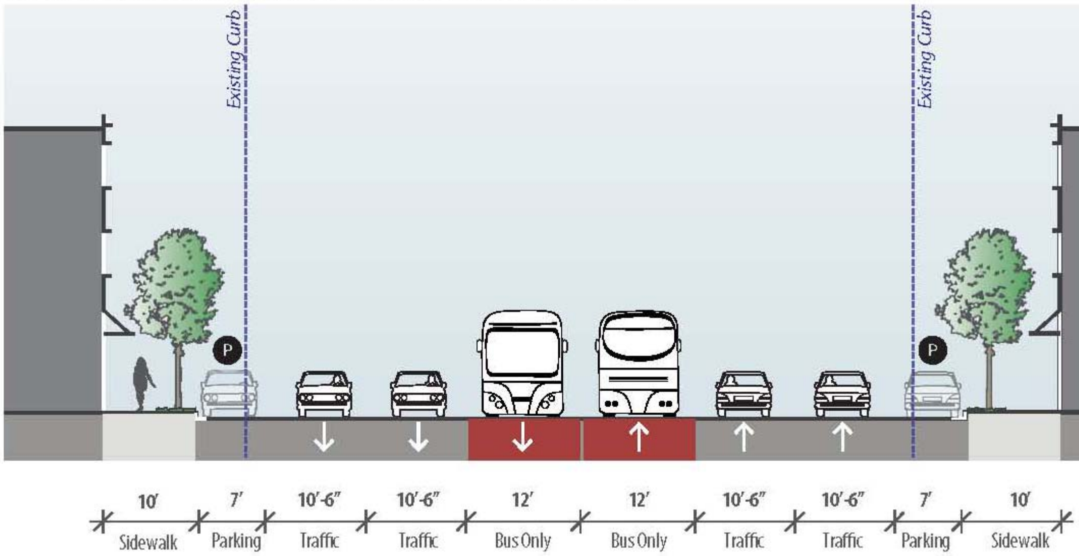
SOA-4: BRT Curbside Bus Lanes, Remove Parking (70 CtC, 100′ ROW)



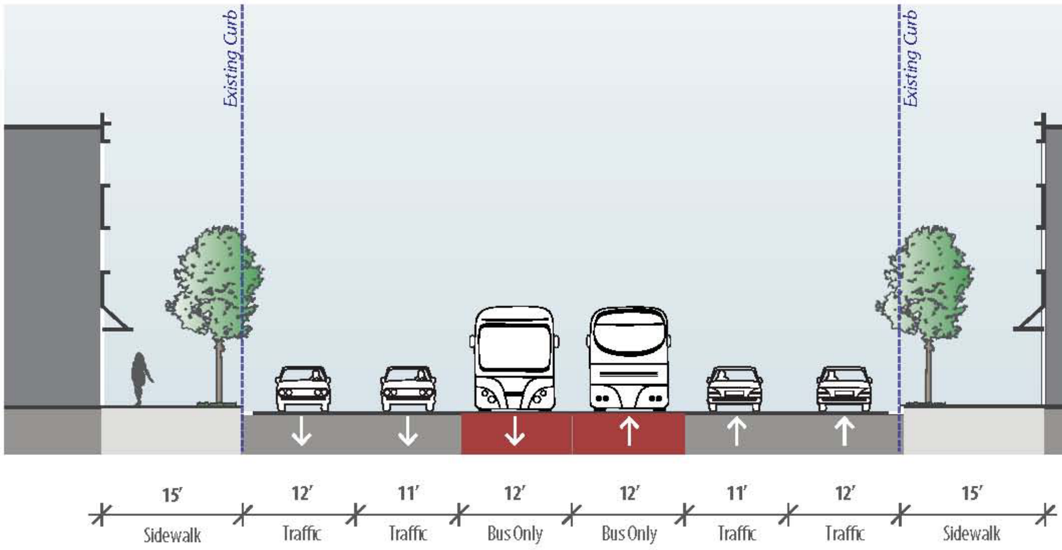
SOA-5: BRT Center Bus Lanes, Remove Travel Lanes (70 CtC, 100′ ROW)



SOA-6: BRT Center Bus Lanes, Reduce Sidewalk Width (80 CtC, 100′ ROW)



SOA-7: BRT Center Bus Lanes, Remove Parking (70 CtC, 100′ ROW)



The next step in this AA will be to define each of these alternatives in greater detail. This screen two evaluation will include an assessment of alternatives based on impacts resulting from the removal of parking, medians, parking spaces, loading zones and the effects of taking a lane on regional traffic movements. The screen two process will also assess ridership, capital costs, bus and automobile travel times, and determine potential station locations. Public and stakeholder meetings will be conducted to review the results of this screen two evaluation and obtain additional public input. The results of the tiered screening process, in coordination with the public involvement process and the ability of alternatives to best meet the project's purpose and need, will be used to identify a recommended LPA that can be adopted into the Metroplitan Planning Organization's LRTP and move forward into environmental analysis, design, construction and operation.

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Appendix B-1: Regional Traffic Diversion Analysis

Memorandum

Date: *November 6, 2013*

Subject: *Regional Traffic Diversion Analysis*

Prepared By: CDM Smith, Inc.

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and the Federal Transit Administration (FTA), is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue BRT Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

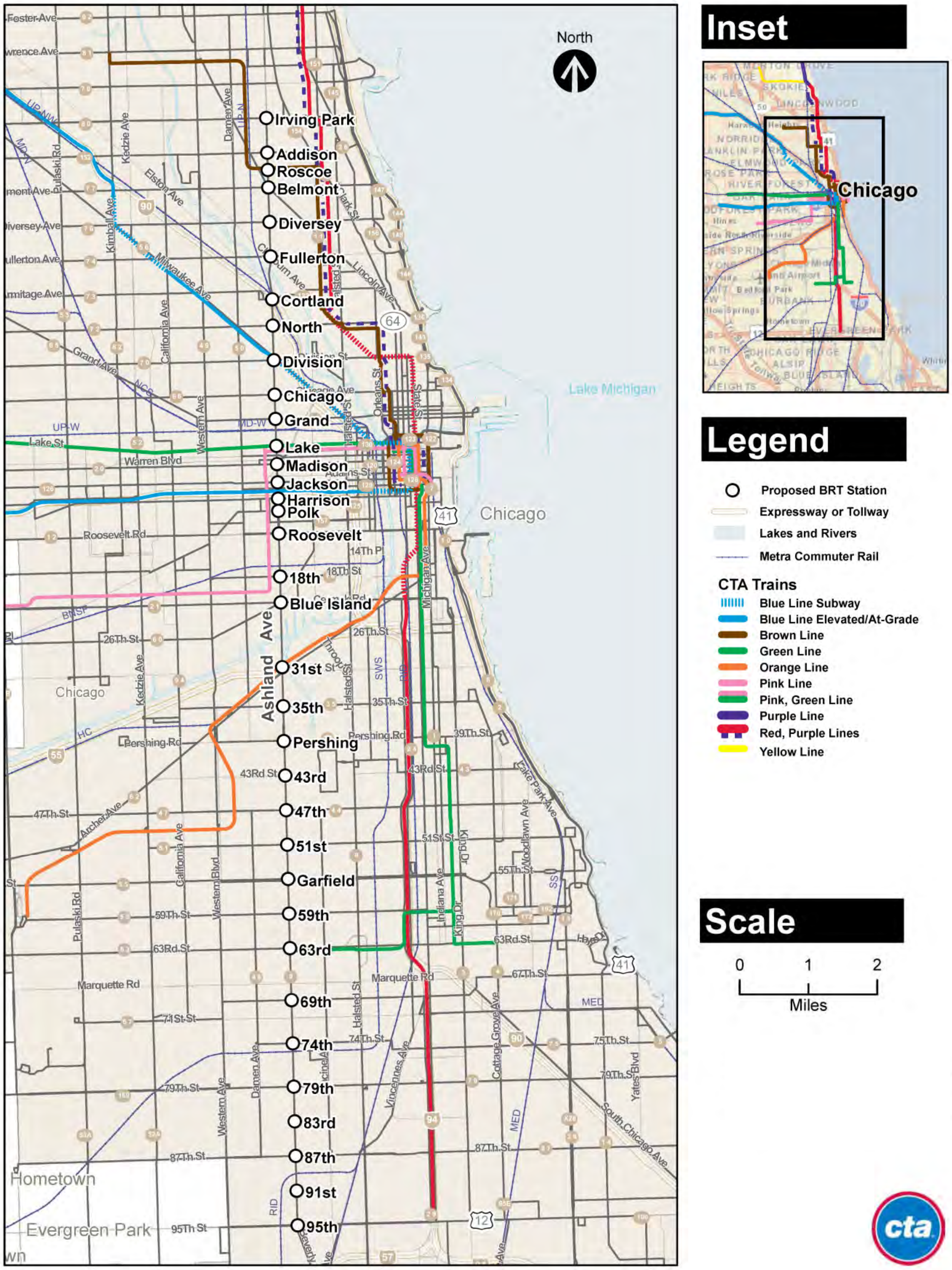
- Construction of median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jumps at select locations and left-turn restrictions at most intersections
- Removal of travel lanes and left-turn lanes to accommodate a designated bus-only lane in each direction

There are 35 proposed BRT station locations, which are shown in **Figure 1.**

Purpose

The purpose of this memorandum is to evaluate the impact of the proposed project on travel patterns within the City of Chicago as a result of removing a lane in each direction and removal of left turns. The evaluation uses a travel demand model to assess the **relative traffic shifts** resulting from the implementation of BRT as **a first of a multi-step transportation analysis process**. This evaluation includes both a general study area impact and an overall regional impact to vehicular travel.

Figure 1: Proposed BRT Station Location Map



Due to the model's size, complexity, and intended use to measure regional impacts, the modeled results **are not intended** to be utilized to measure intersection-specific impacts. Therefore, additional 2013 traffic counts and SYNCHRO analyses have been performed to address intersection-by-intersection impacts. Results of the entire analysis can be found in Chapter 3 of the Environmental Assessment for the Ashland Avenue BRT Project.

Traffic Diversion Methodology Overview

Assessing the traffic impacts resulting from the conversion of one existing travel lane in each direction on Ashland Avenue to center running dedicated bus-only lanes and the removal of most left-turns along Ashland Avenue is a key factor in advancing the BRT project. Travel demand models are a standard transportation planning tool utilized in the analysis of transportation impacts of new projects. Through the use of a travel demand model, it is possible to compare modeled existing conditions and projected future travel demands.

The Chicago Metropolitan Agency for Planning (CMAP) developed and maintains the Chicago region's travel demand model. It is used for major transportation planning projects throughout the Chicago metropolitan area and, appropriately, was utilized for the analysis of the potential traffic impacts of the Ashland Avenue BRT Project.

Two primary outputs of the travel demand model that are used in evaluating travel demand between existing conditions and proposed conditions are vehicle miles traveled (VMT) and vehicle hours traveled (VHT). These measure the amount of driving taking place, cumulatively, in a given area or along a given corridor. VMT measures the total number of miles driven; VHT measures the total time spent driving.

The technical methodology used in analyzing these impacts included the following steps:

1. Utilize the CMAP travel demand model to compare regional daily (24-hour) changes in VMT and VHT between existing conditions and proposed conditions with implementation of the proposed Ashland Avenue BRT Project (Build Conditions).

2. Use the results of the CMAP regional traffic analysis (Step 1) to identify a reasonable study area boundary for further analysis and estimate the magnitude of change in daily (24-hour) VMT, VHT and average travel speeds on these parallel roadways within the study area. The study area boundary is based on the major parallel routes anticipated to be impacted as a result of traffic diverting from Ashland Avenue.

The primary objective of this analysis is to determine the change that would result from implementation of the proposed Ashland Avenue BRT Project. Therefore, the **relative percent changes rather than absolute values** are used in determining changes between Existing and Build conditions. These relative changes in the data between Existing and Build Conditions from the model provides a standard best practice forecast of traffic diversion expected to result from Build Conditions.

The following sections include a description of the CMAP travel demand model, study area, analysis assumptions, and analysis results.

CMAP Travel Demand Model

CMAP has developed and maintains its travel demand model which is used for transportation planning within the Chicago metropolitan area. In its most simplistic form, the travel demand model converts people and employees into daily trips, locates the starting and ending points for those trips and then assigns mode split between different transportation options and a path for completing these trips. While CMAP's planning region contains seven counties, CMAP's travel demand model covers a larger area encompassing the following:

- 12 full counties and three partial counties in Illinois
- three full counties in Indiana and
- three full counties in Wisconsin.

The Indiana counties comprise the metropolitan planning area for the Northwestern Indiana Regional Planning Commission (NIRPC). **Figure 2** shows the extents of CMAP highway network and the counties it covers. The CMAP travel demand model consists of the following roadway types: freeways/expressways, arterials and collectors; local roads are not included. .Given the main focus of this document, only a broad description of the CMAP travel demand model is provided. An official CMAP publication provides details of the model.[1]

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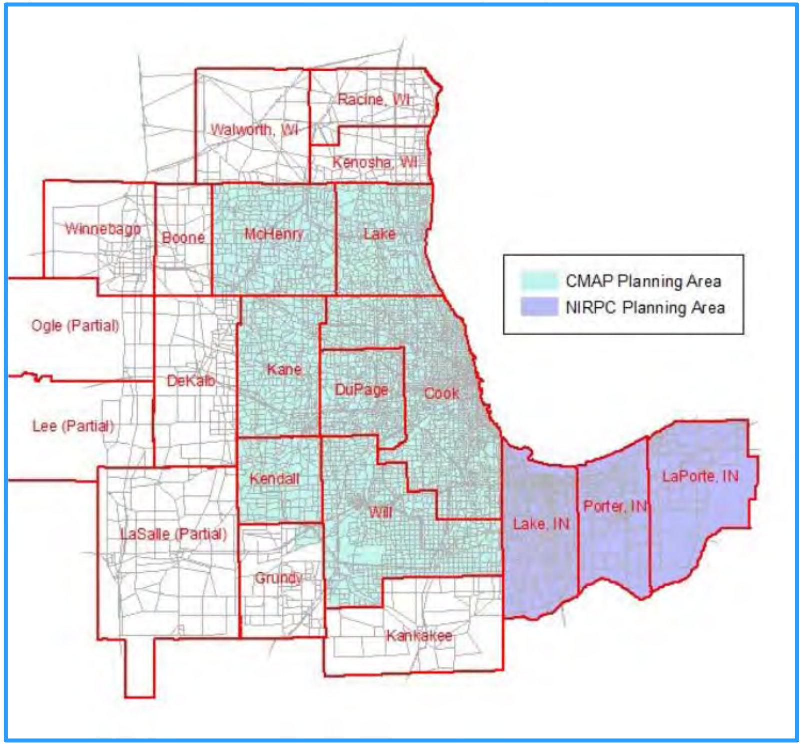
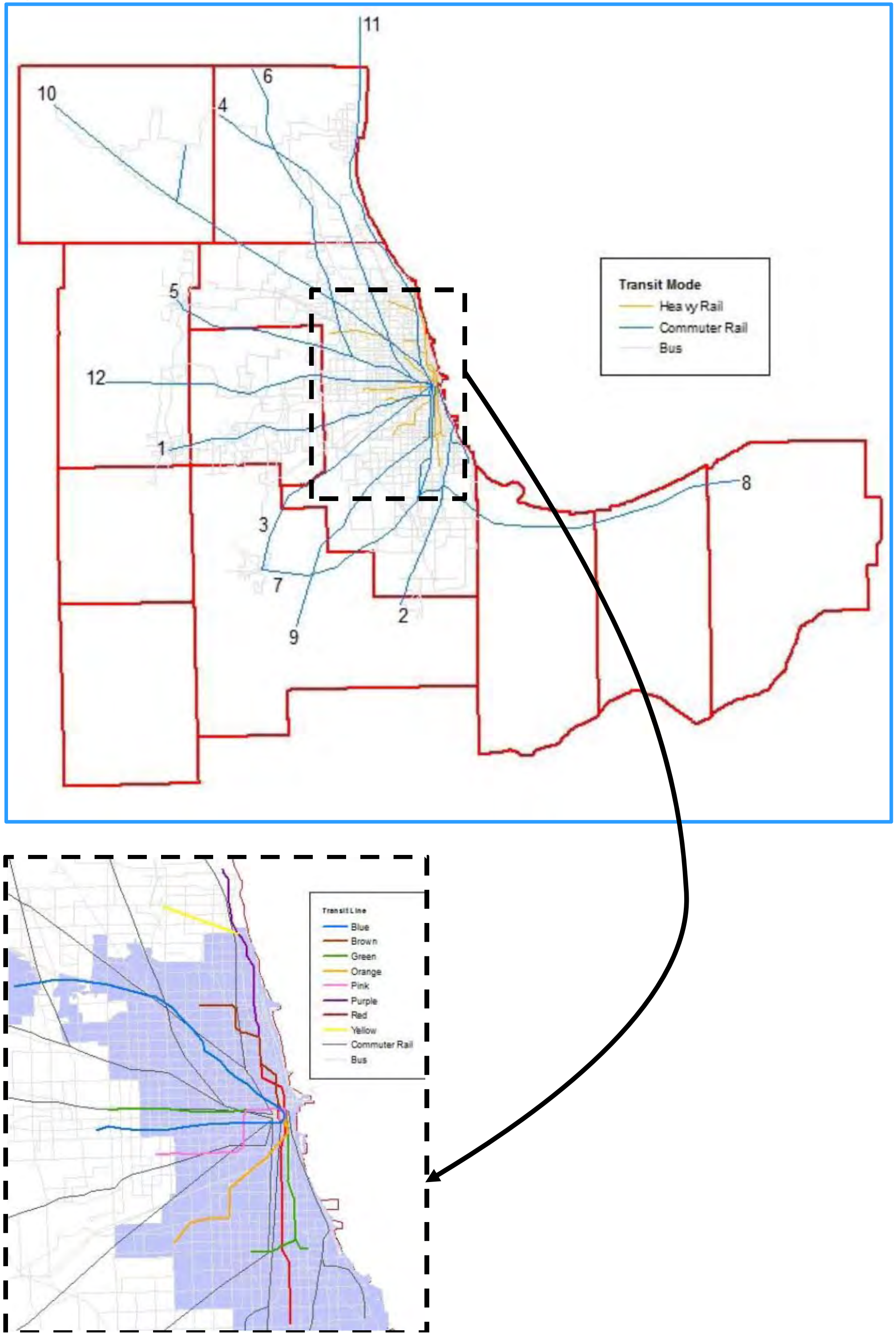
[1] CMAP (2010), Travel Demand Model Documentation Report.
http://www.cmap.illinois.gov/c/document_library/get_file?uuid=cab76c8f-7d87-479f-8808-

Figure 2: CMAP Travel Demand Model Highway Network



In addition to the highway network, the CMAP travel demand model contains full representation of the transit system including heavy rail, commuter rail and buses. **Figure 3** provides a snapshot of the transit system used in the travel demand model.

Figure 3: CMAP Travel Demand Model Transit Network



CMAP's regional travel demand model is periodically validated against actual observed data and held to a federal standard on the amount the travel demand model results may deviate from observed results. The CMAP travel demand model variation (approximately 7.6%) is within the acceptable range of the federal standards for this measure. More information on validation techniques and results of the CMAP model on this topic can be found in CMAP's Travel Demand Model Validation Report[2].

Project Study Area

Initial

To identify a reasonable project study area for diversion analysis, initial travel demand model results were obtained to understand changes in VMT and VHT from a regional transportation perspective. Based on initial travel demand model results, the Ashland Avenue BRT services would result in minimal changes to city-wide traffic conditions. Compared to the existing conditions, VMT would decrease by 0.01% and VHT would increase by 0.08% across the entire City of Chicago. In addition, initial results showed that the changes to traffic conditions largely occur from Kedzie Avenue in the west to Halsted Street in the east (see **Figure 8**), which are used as the project study area boundaries.

Refined

Given the minor city-wide changes outside of Kedzie Avenue to Halsted Street, a smaller study area surrounding the Ashland Avenue BRT service corridor was selected for more detailed traffic analysis as indicated by the black dashed line in **Figure 4**. The roadway network study area included major parallel north-south roadways to the east and west of Ashland Avenue, bounded by Irving Park Road, to the north, and 95th Street, to the south. The eastern study area boundary for the purposes of the focused analysis was Halsted Street and the western boundary was Kedzie Avenue.

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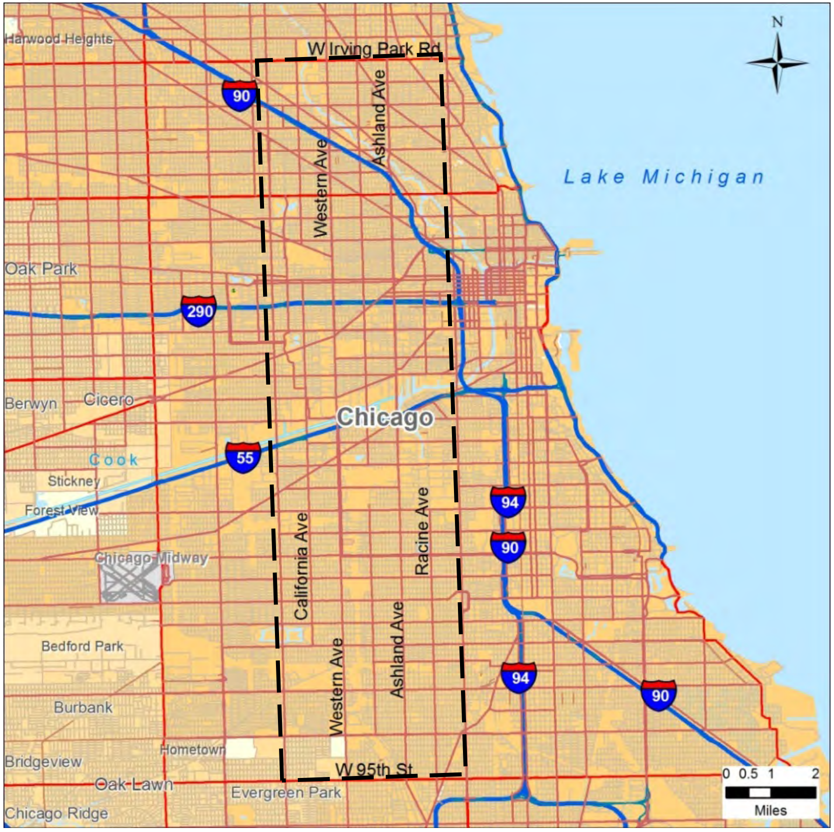
[2] CMAP (2011). Travel Demand Model Validation Report.
http://www.cmap.illinois.gov/c/document_library/get_file?uuid=c5eaeec4-f581-4126-bce1-

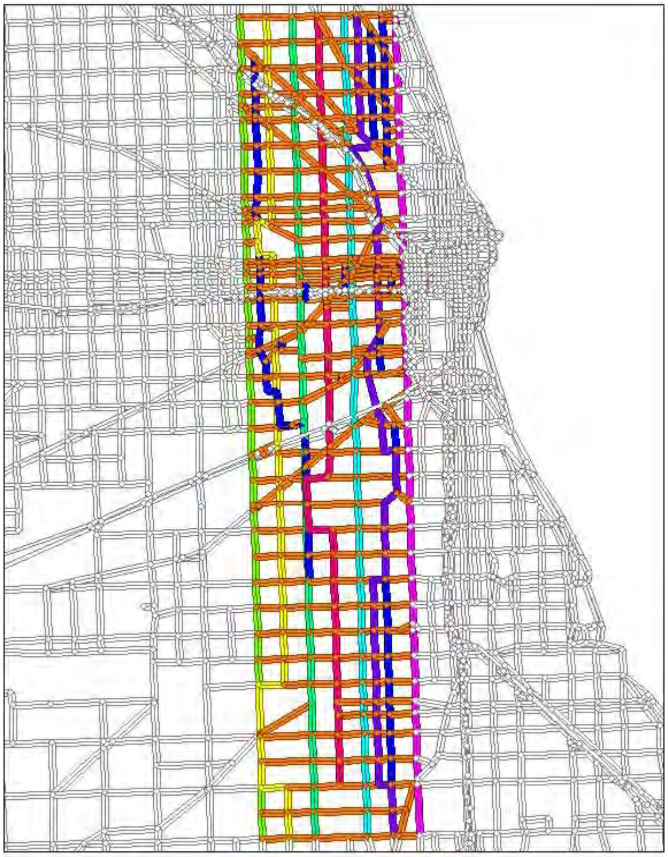
Figure 4: Project Study Area



The following parallel north-south roadways were identified for detailed tabulations as shown on **Figure 5**:

- Kedzie Avenue (Light Green)
- California Avenue (Yellow)
- Western Avenue (Dark Green)
- Damen Avenue (Red)
- Ashland Avenue (Light Blue)
- Racine/Southport Avenue and other roadways (Purple)
    - Racine and Southport Avenues provide parallel travel options for traffic, but are not continuous throughout the 16.1-mile long study area. Because they are not continuous, the model results along this north-south corridor were tabulated for parts of Racine, Southport and other routes representing the likely diversion along this parallel route. **Attachment A** includes the full list of roadways, which comprise this parallel route.
- Halsted Street (Pink)
- Other North-South roadways within the study area (Dark Blue)

Figure 5: Study Area Roadways



Summary data for the study area were developed as follows:

- North-South Corridor – summation of all north-south roadways highlighted in **Figure 5**
- East-West Corridor – summation of all east-west roadways bounded by Kedzie Avenue to the west and Halsted Street to the east (highlighted in orange in **Figure 5**). **Attachment A** includes a full list of these east-west roadways.
- Combined Corridor – summation of both the North-South and East-West Corridors

The transit network included all existing north-south CTA bus routes that operate on north-south roadways contained in the roadway study area. These routes included:

- #8 Halsted
- #9 Ashland
- #44 Wallace-Racine
- #48 South Damen
- #49 Western
- #49A South Western
- #50 Damen
- #52 Kedzie-California
- #52A South Kedzie
- #94 South California
- Proposed Ashland BRT (Build Conditions only)

Model Input Assumptions

Using the travel demand model and study area described above, an initial analysis was performed. The primary objectives of this analysis were:

- To determine study area impacts of implementing BRT on the Ashland Avenue corridor
- To determine the congestion impacts on alternate routes within the study area as a result of capacity reduction on the Ashland Avenue corridor
- To identify possible impacts outside of the study area due to re-routing of traffic

The following metrics were measured and compared between the Existing and the Build Alternative conditions:

1. Vehicle Miles Traveled (VMT)
    - Summation of all VMT on roadway facility segments
2. Percent Congested VMT
    - Congested VMT, summation of all VMT on roadway facility segments where the volume exceeds capacity (v/c >1), compared to total VMT
3. Vehicle Hours Traveled (VHT)
    - Summation of all VHT on roadway facility segments
4. Percent Congested VHT –
    - Congested VHT, summation of all VHT on roadway facility segments where the volume exceeds capacity (v/c >1), compared to total VHT
5. Travel Speed
    - Average congested travel speed (mph) on roadway facility segments (both directions)

Existing Conditions

The Existing conditions assumptions were based on the regional modeling inputs used for the 2010 analysis year in the air quality conformity analysis completed by CMAP in spring 2012 (C12 Q1). The roadway network represented the existing segment geometrics and capacity, left- and right-turn restrictions, and traffic signal timings. The transit network represented the existing bus route stop locations, headways, service span, and running speeds.

Build Conditions

The Build Conditions assumptions include the following based on maximum operational characteristics of the Ashland Avenue BRT Project:

- Left-Turn Restrictions – left-turns were restricted at all the intersections along Ashland Avenue between Irving Park Road, to the north, and 95th Street, to the south.
- Travel Lane Removal – one travel lane in each direction was removed along Ashland Avenue between Irving Park Road, to the north, and 95th Street, to the south.
- BRT Service Characteristics – proposed Ashland BRT included 24-hour service span, 5 minute headways, 15.9 miles per hour (mph) average running speed, and 35 proposed stop locations; local bus service remained in place.

Analysis Results

Existing Conditions

The daily existing conditions results are shown in **Tables 1 and 2**. Daily vehicle flows are shown on **Figure 6**. Along Ashland Avenue, 17% and 21% of all VMT and VHT, respectively, occurs under congested conditions, resulting in an average travel speed of 18.3 mph. Ashland Avenue experiences lower levels of congested VMT and VHT and faster travel speed than the North-South Corridor.

Table 1: Existing Conditions Results by North-South Routes

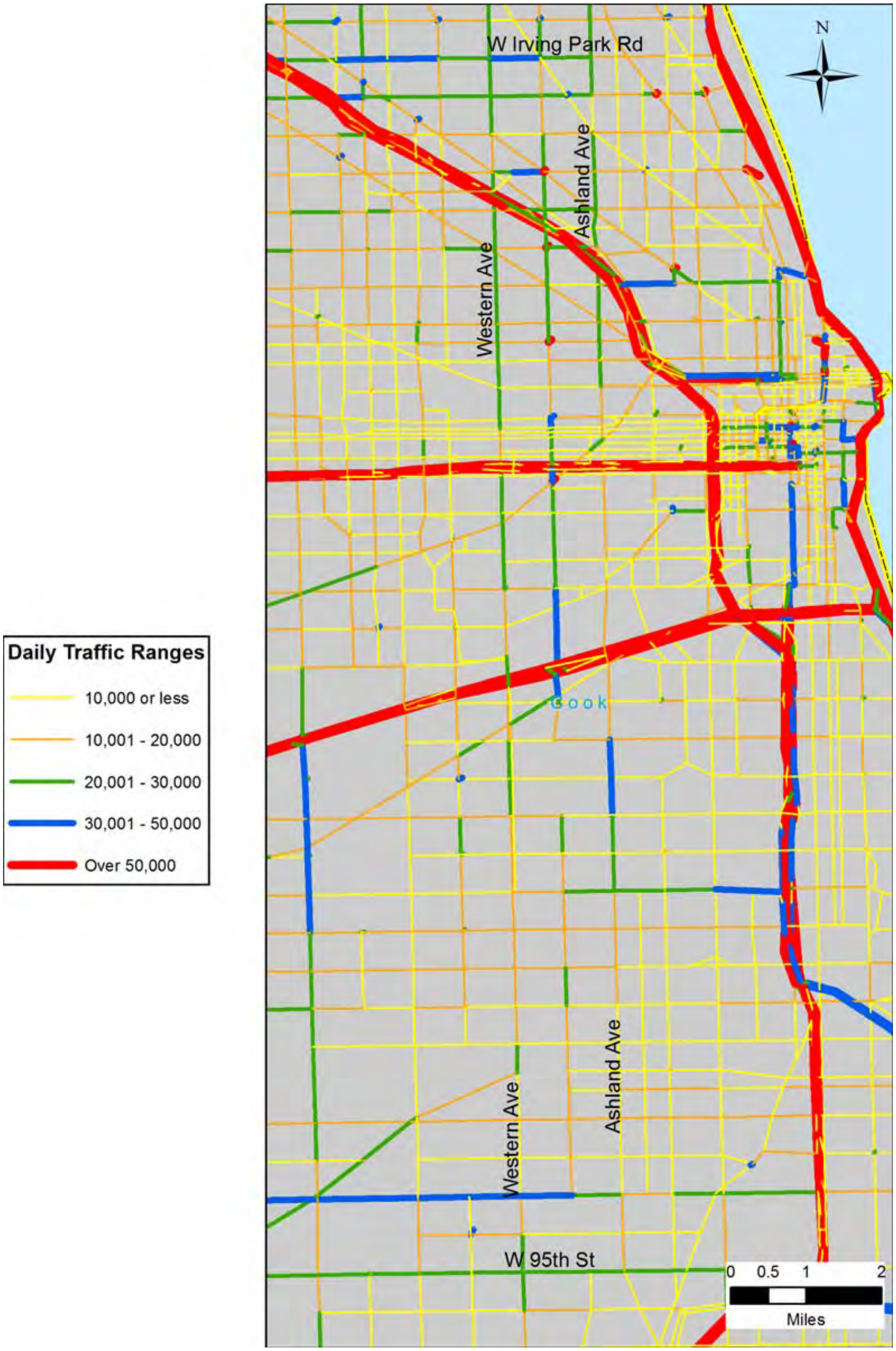
	Kedzie Ave.	California Ave.	Western Ave.	Damen Ave.	Ashland Ave.	Racine Ave./ Southport Ave. (and other routes)	Halsted St.	Other North-South Roadways
VMT	89,928	178,394	306,429	322,336	264,626	104,853	121,022	170,158
% Congested VMT	12%	18%	15%	44%	17%	15%	21%	8%
VHT	5,064	10,164	16,658	17,606	13,643	6,136	6,695	10,081
% Congested VHT	18%	28%	18%	51%	21%	22%	28%	14%
Travel Speed	20.6	15.5	18.1	17.3	18.3	17.9	17.4	17.0

Table 2: Existing Conditions Results by Corridor

	North-South Corridor	East-West Corridor	Study Area
VMT	1,557,746	1,484,645	3,042,391
% Congested VMT	21%	21%	21%
VHT	86,047	83,025	169,072
% Congested VHT	27%	27%	27%
Travel Speed	17.6	n/a	n/a

In reviewing the existing conditions travel demand model outputs, the VMT for Damen Avenue appears to be higher than expected when compared with other parallel routes in the study area. However, the modeled VMT value is not used in the analysis, rather the relative change between Existing and Build Conditions is used, which is the best indicator for regional traffic diversion.

Figure 6: Existing Conditions Daily Flow



Build Conditions

The daily Build Alternative conditions results are shown in **Tables 3 and 4**. Daily vehicle flows are shown on **Figure 7**. Along Ashland Avenue, 27% and 34% of all VMT and VHT, respectively, would occur under congested conditions, resulting in an average travel speed of 16.7 mph. Ashland Avenue would experience higher levels of congested VMT and VHT and slower travel speed than the North-South Corridor due to the travel lane removals.

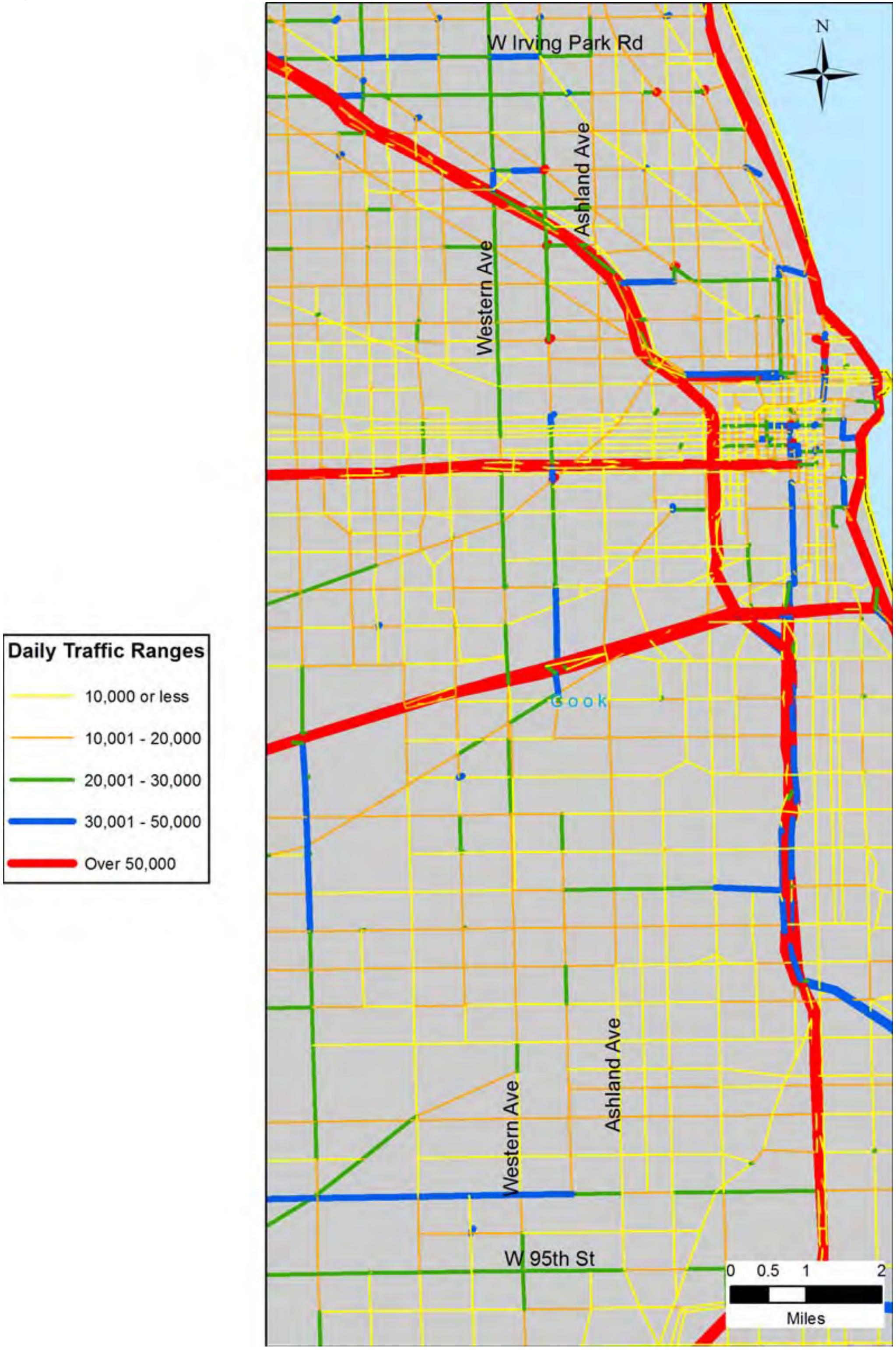
Table 3: Build Alternative Conditions Results by North-South Routes

	Kedzie Ave.	California Ave.	Western Ave.	Damen Ave.	Ashland Ave.	Racine Ave/ Southport Ave. (and other routes)	Halsted St.	Other North-South Roadways
VMT	92,252	181,079	324,322	330,349	172,335	117,424	126,290	179,267
% Congested VMT	12%	19%	18%	45%	27%	17%	21%	9%
VHT	5,228	10,365	17,875	18,454	9,061	6,896	7,029	10,671
% Congested VHT	18%	30%	22%	53%	34%	24%	28%	15%
Travel Speed	20.4	15.4	17.8	16.8	16.7	17.4	17.2	16.8

Table 4: Build Alternative Conditions Results by Corridor

	North-South Corridor	East-West Corridor	Study Area
VMT	1,523,319	1,486,407	3,009,726
% Congested VMT	24%	21%	22%
VHT	85,579	83,301	168,880
% Congested VHT	30%	27%	29%
Travel Speed	17.1	n/a	n/a

Figure 7: Build Alternative Conditions Daily Flow



Comparison of Existing and Build Alternative Conditions Results

The comparison of Existing and Build Alternative conditions results are shown in **Tables 5 and 6**. As shown on **Figure 8**, the Build Alternative conditions will result in a traffic shift from Ashland Avenue to other facilities in the surrounding roadway network. However, the results of the analysis indicate that the robust Chicago grid network is sufficient to absorb the traffic shifts across multiple parallel facilities, resulting in minor VMT increases (two percent to 12 percent) along any single roadway within the Study Area. The grid network provides many different traffic routing options for drivers between origins and destinations within the city. Individual driving patterns would change to adapt to the Build Alternative conditions along Ashland Avenue and traffic would naturally redistribute to parallel roadways.

Table 5: Comparison of Existing and Build Alternative Conditions Results by North-South Routes

	Kedzie Ave.	California Ave.	Western Ave.	Damen Ave.	Ashland Ave.	Racine Ave./ Southport Ave. (and other routes)	Halsted St.	Other North-South Roadways
VMT	3%	2%	6%	2%	-35%	12%	4%	5%
Congested VMT	4%	8%	29%	4%	7%	25%	4%	16%
VHT	3%	2%	7%	5%	-34%	12%	5%	6%
Congested VHT	5%	6%	30%	8%	7%	24%	6%	13%
Travel Speed	1%	1%	2%	3%	10%	3%	1%	-1%

Along Ashland Avenue, the Build Alternative conditions would decrease VMT by 35% and increase congested VMT by 7%. Similarly, VHT would decrease by 34% and congested VHT would increase by 7%, resulting in a 10% decrease in travel speed.

VMT and VHT are metrics that describe the length and time of travel along a given roadway. These metrics will change as travel patterns within the study area change. Therefore, the total within the study area would not be equal in Existing and Build conditions. Specifically any decrease in VMT or VHT along Ashland Avenue would not result in an equal increase in VMT or VHT on parallel roadways within the study area. Changes to these metrics are based on, but not limited to, a combination of the following:

- Vehicle traffic shifts to other roadways
- Changes to existing commuting patterns (single occupant vehicle to carpool, vehicle to transit, etc.)
- Changes in the transportation system (introduction of additional travel modes, reduction of vehicle travel lanes, etc.)
- Changes in the origins and destination of trips within the study area based on the changes to the transportation system
- Changes in the number of daily trips
- Changes in the length of daily trips

Figure 8: Comparison of Existing and Build Alternative Conditions Daily Flow

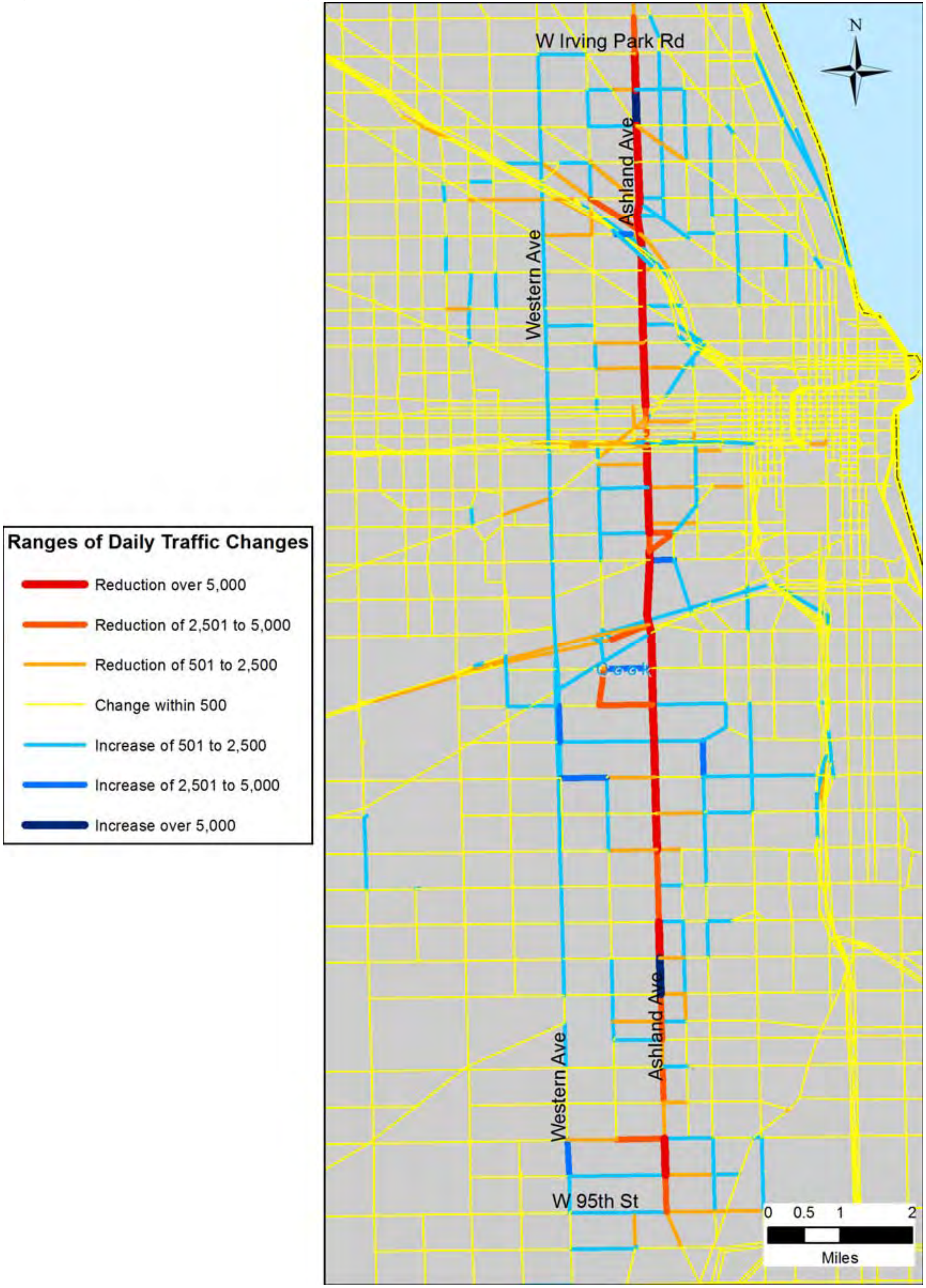


Table 6: Comparison of Existing and Build Alternative Conditions Results by Corridors

	North-South Corridor	East-West Corridor	Study Area
VMT	-2%	0%	-1%
Congested VMT	10%	0%	5%
VHT	-1%	0%	0%
Congested VHT	11%	1%	6%
Travel Speed	-3%	n/a	n/a

Along the North-South Corridor, the Build Alternative conditions would decrease VMT by 2% and increase congested VMT by 10%. Similarly, VHT would decrease by 1% and congested VHT would increase by 11%, resulting in a 3% decrease in travel speed.

Along the East-West Corridor, the Build Alternative conditions would not change VMT nor congested VMT. Similarly, VHT would not change and congested VHT would increase by 1%. Within the Study Area, the Build Alternative conditions would decrease VMT by 1% and increase congested VMT by 5%. Similarly, VHT would not change and congested VHT would increase by 6%.

Attachment A

A complete list of the roadways tabulated for the Racine Avenue/Southport Avenue corridor, shown in Purple in Figure 5 of the memo, is as follows (from north to south):

- Southport Avenue (Irving Park Road to Clybourn Avenue)
- Clybourn Avenue (Southport Avenue to Cortland Street)
- Cortland Street (Clybourn Avenue to Elston Avenue)
- Elston Avenue (Cortland Street to Milwaukee Avenue)
- Milwaukee Avenue (Elston Avenue to Ogden Avenue)
- Ogden Avenue (Milwaukee Avenue to Racine Avenue)
- Racine Avenue (Ogden Avenue to Blue Island Avenue)
- Blue Island Avenue (Racine Avenue to Loomis Street)
- Loomis Street (Blue Island Avenue to 31st Street)
- 31st Street (Loomis Street to Racine Avenue)
- Racine Avenue (31st Street to 35th Street)
- 35th Street (Racine Avenue to Morgan Street)
- Morgan Street (35th Street to 43rd Street)
- 43rd Street (Morgan Street to Racine Avenue)
- Racine Avenue (43rd Street to Garfield Boulevard)
- Garfield Boulevard (Racine Avenue to Loomis Boulevard)
- Loomis Boulevard (Garfield Boulevard to 87th Street)
- 87th Street (Loomis Boulevard to Racine Avenue)
- Racine Avenue (87th Street to 95th Street)

The other North-South roadways within the study area shown in Dark Blue in Figure 5 of the memo include:

- Humboldt Boulevard (Milwaukee Avenue to Grand Avenue)
- Sacramento Boulevard (Fulton Street to Marshall Boulevard)
- Marshall Boulevard (Sacramento Boulevard to California Boulevard)
- California Boulevard (Marshall Boulevard to 31st Boulevard)
- 31st Boulevard (California Boulevard to Western Boulevard)
- Western Boulevard (31st Boulevard to Garfield Boulevard)
- Washtenaw Avenue (Ogden Avenue to 16th Street)
- Oakley Boulevard (Adams Street to Harrison Street)
- Paulina Street (Washington Boulevard to Congress Parkway)
- Morgan Street (Adams Street to Harrison Street)
- Sangamon Street (Monroe Street to Madison Street)
- Green Street (Washington Boulevard to Randolph Street)
- Throop Street (Washington Boulevard to 95th Street)
- Racine Avenue (Clark Street to Clybourn Avenue)
- Sheffield Avenue (Irving Park Road to North Avenue)

- Racine Avenue (Blue Island Avenue to Cermak Road)
- Morgan Street (31st Street to 35th Street)
- Racine Avenue (Garfield Avenue to 87th Street)

The east-west roadways bounded by Kedzie Avenue, to the west, and Halsted Street, to the east, shown in orange in Figure 5 of the memo, include the following within the study area:

- Irving Park Road
- Addison Street
- Belmont Avenue
- Diversey Avenue
- Logan Boulevard (Kedzie Avenue to Diversey Avenue)
- Fullerton Avenue
- Webster Avenue (Damen Avenue to Clybourn Avenue)
- Armitage Avenue
- North Avenue
- Division Street
- Augusta Boulevard (Kedzie Avenue to Kennedy Expressway)
- Chicago Avenue
- Grand Avenue
- Lake Street
- Washington Boulevard
- Randolph Street
- Warren Boulevard
- Madison Street
- Monroe Street (Ashland Avenue to Halsted Street)
- Adams Street (Western Avenue to Halsted Street)
- Jackson Boulevard
- Van Buren Street (Western Avenue to Halsted Street)
- Congress Parkway (Western Avenue to Racine Avenue)
- Harrison Street
- Polk Street (Damen Avenue to Ashland Avenue)
- Taylor Street (Racine Avenue to Halsted Street)
- 16th Street (Kedzie Avenue to Western Avenue)
- 16th Street (Ashland Avenue to Halsted Street)
- 18th Street (Western Avenue to Halsted Street)
- Cermak Road
- 26th Street (Kedzie Avenue to Western Avenue)
- 31st Street
- 35th Street (California Avenue to Halsted Street)
- Pershing Road

- 43rd Street
- 47th Street
- 51st Street
- Garfield Boulevard
- 59th Street
- 63rd Street
- Marquette Road
- 71st Street
- 74th Street (Damen Avenue to Halsted Street)
- 76th Street (Damen Avenue to Halsted Street)
- 79th Street
- 83rd Street
- 87th Street
- 91st Street
- 95th Street

All diagonal routes in the study area, which the model considers east-west routes and are shown in orange in Figure 5 of the memo include:

- Clark Street
- Lincoln Avenue
- Clybourn Avenue
- Elston Avenue
- Milwaukee Avenue
- Ogden Avenue
- Blue Island Avenue
- Archer Avenue
- 63rd Street Parkway
- Columbus Avenue
- Vincennes Avenue

Ashland BRT Off-Corridor Analysis--Diverted Volumes Existing to Build Alternative (AM Peak)

Legend

(XX) Total Volume Increase during Peak Period

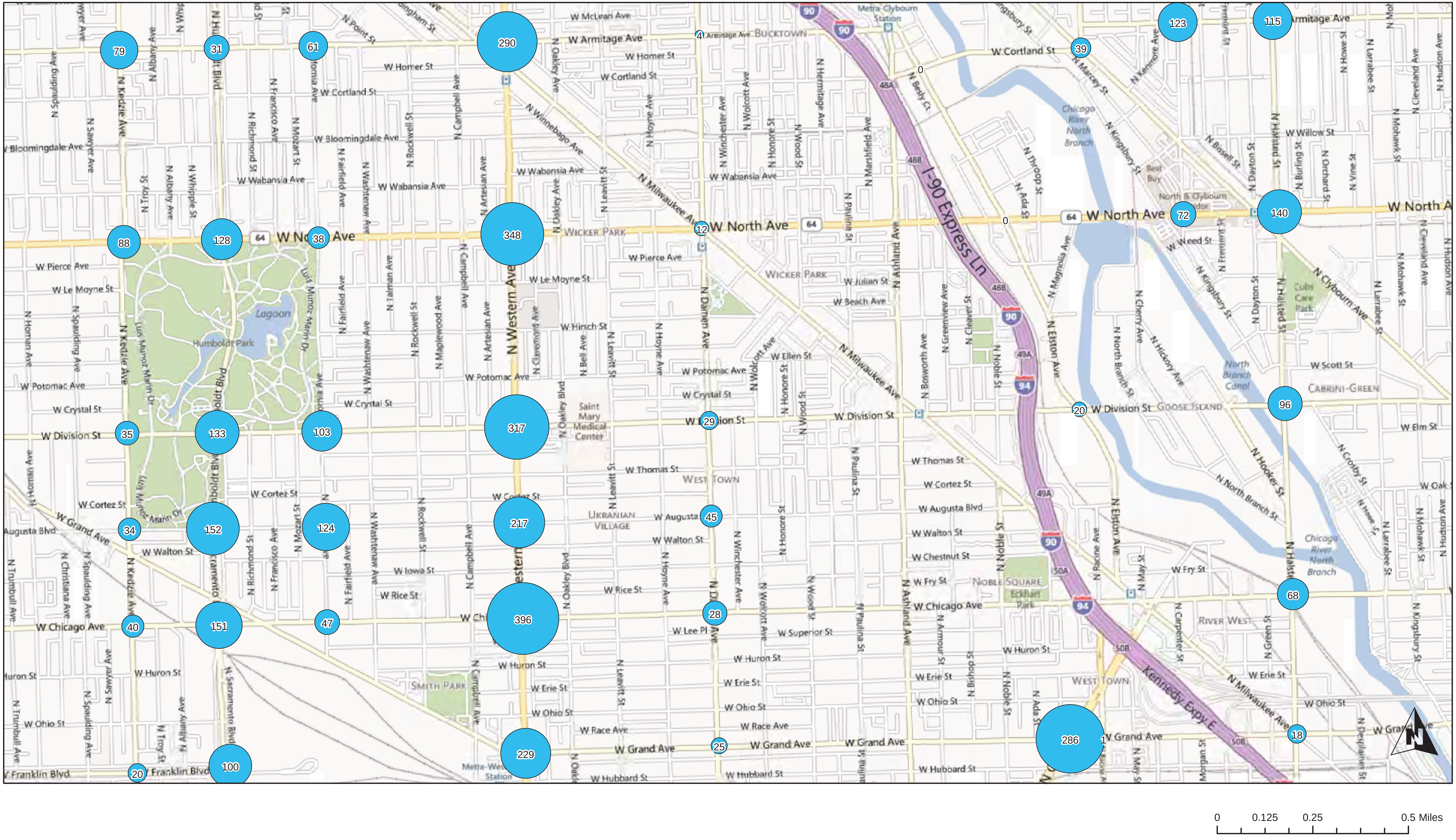
Screenline Percent

● 5%

● 10%

● 25%

● 50%



Ashland BRT Off-Corridor Analysis--Diverted Volumes Existing to Build Alternative (AM Peak)

Legend

(XX) Total Volume Increase during Peak Period

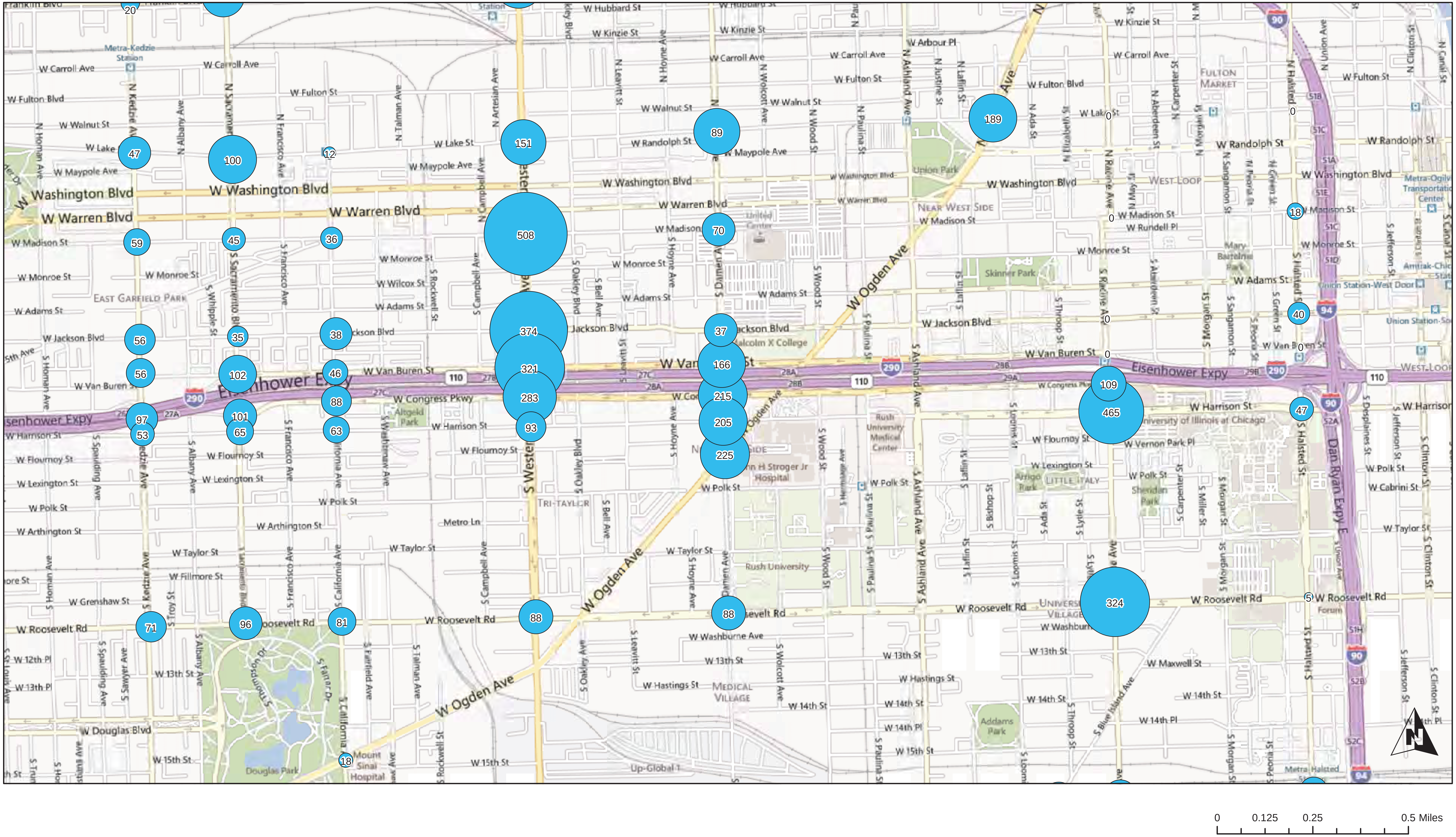
Screenline Percent

● 5%

● 10%

● 25%

● 50%



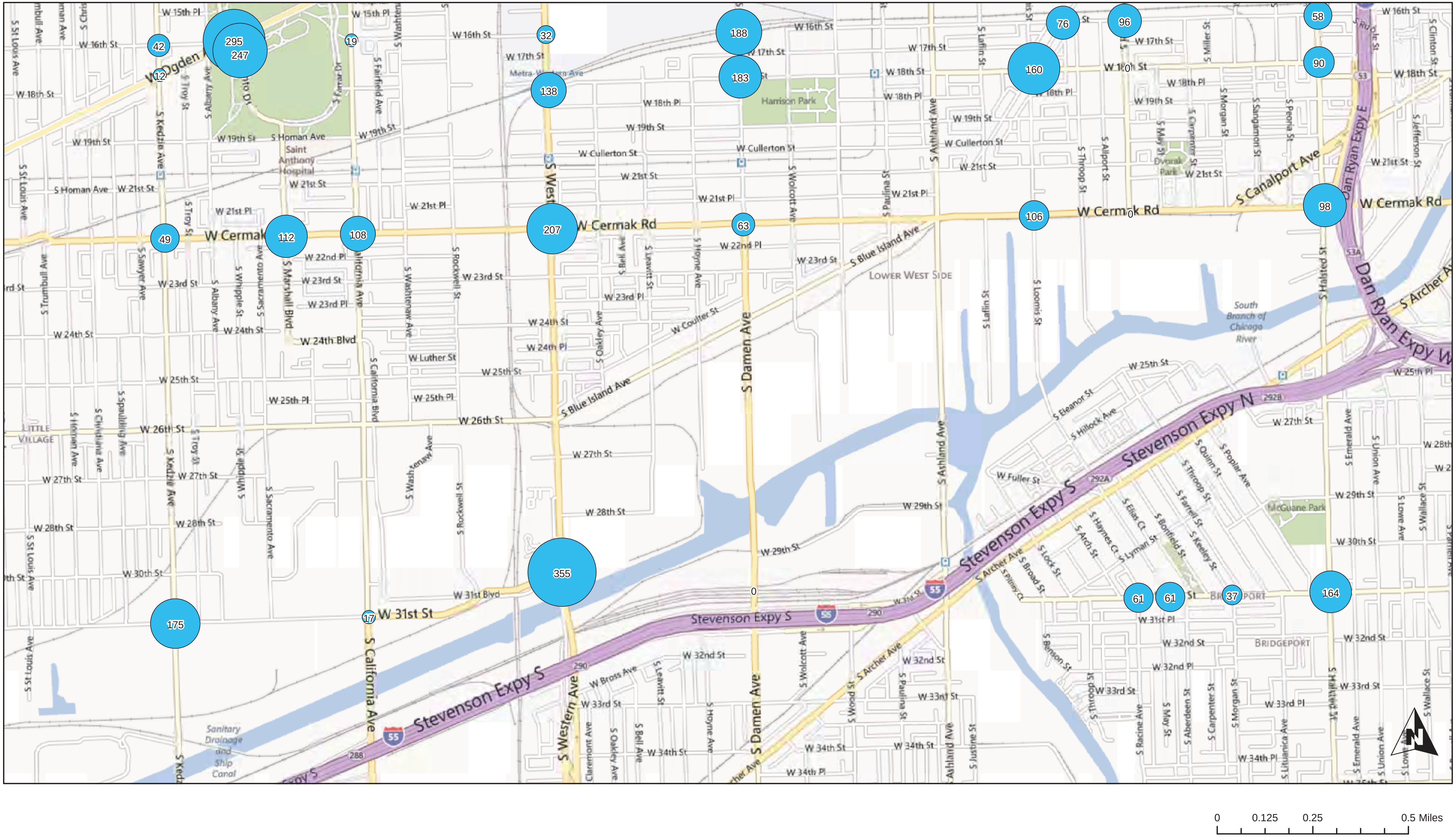
Ashland BRT Off-Corridor Analysis--Diverted Volumes
Existing to Build Alternative (AM Peak)

Legend

(XX) Total Volume Increase during Peak Period

Screenline Percent

- ● 5%
- ● 10%
- ● 25%
- ● 50%



Ashland BRT Off-Corridor Analysis--Diverted Volumes Existing to Build Alternative (PM Peak)

Legend

XX Total Volume Increase during Peak Period

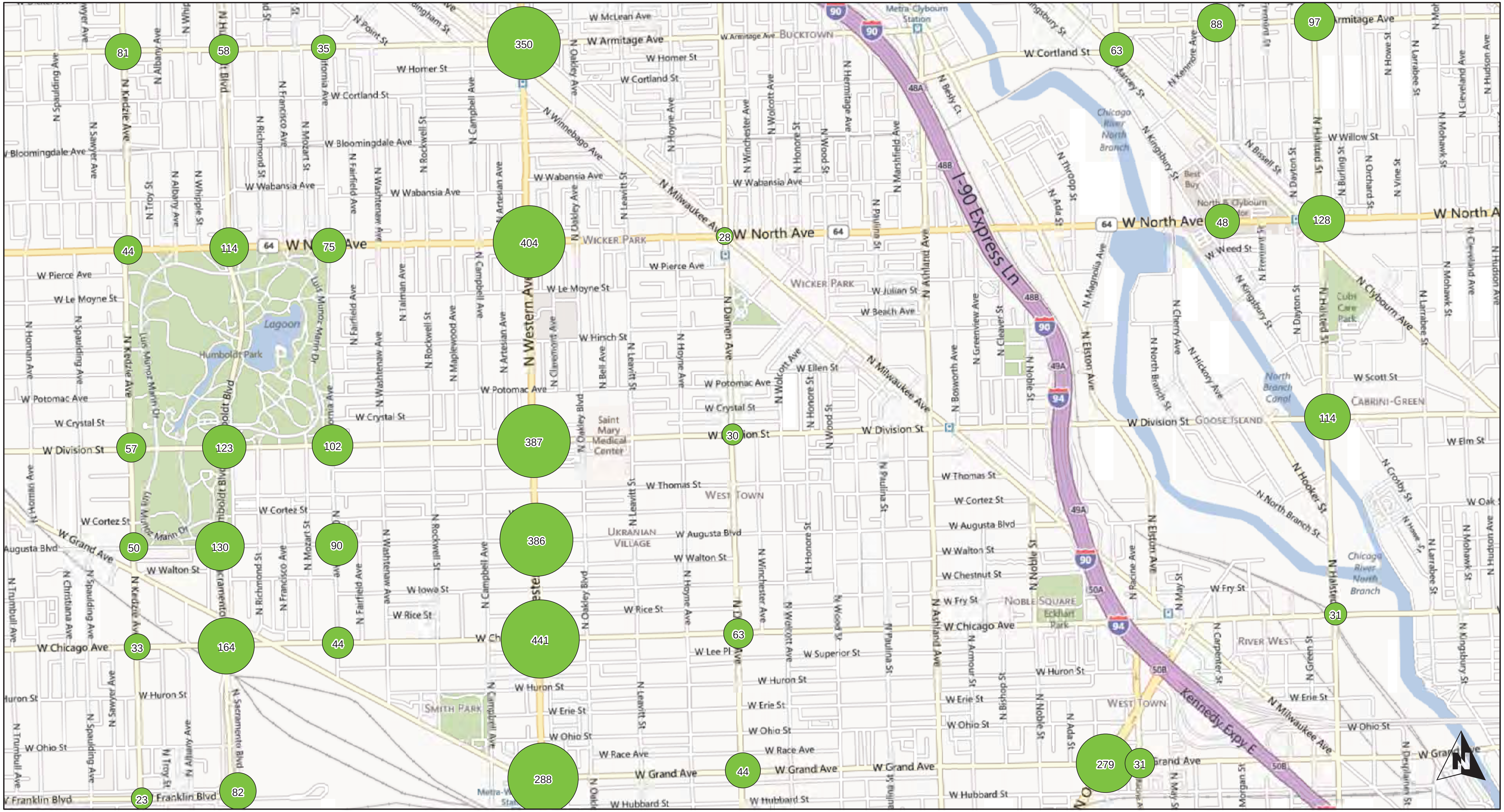
Screenline Percent

● 5%

● 10%

● 25%

● 50%



0 0.125 0.25 0.5 Miles

Ashland BRT Off-Corridor Analysis--Diverted Volumes
Existing to Build Alternative (PM Peak)

Legend

XX Total Volume Increase during Peak Period

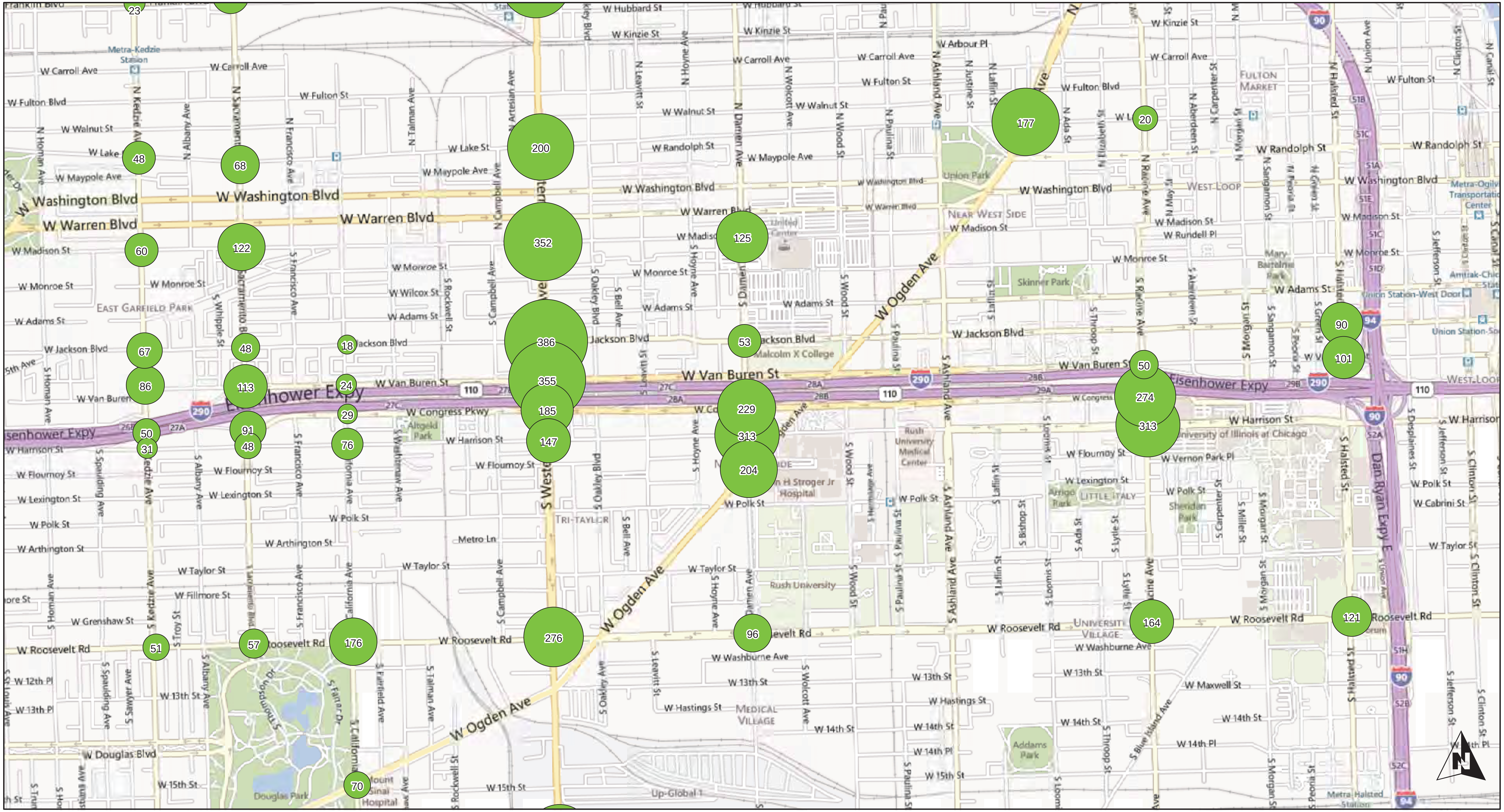
Screenline Percent

● 5%

● 10%

● 25%

● 50%



0 0.125 0.25 0.5 Miles

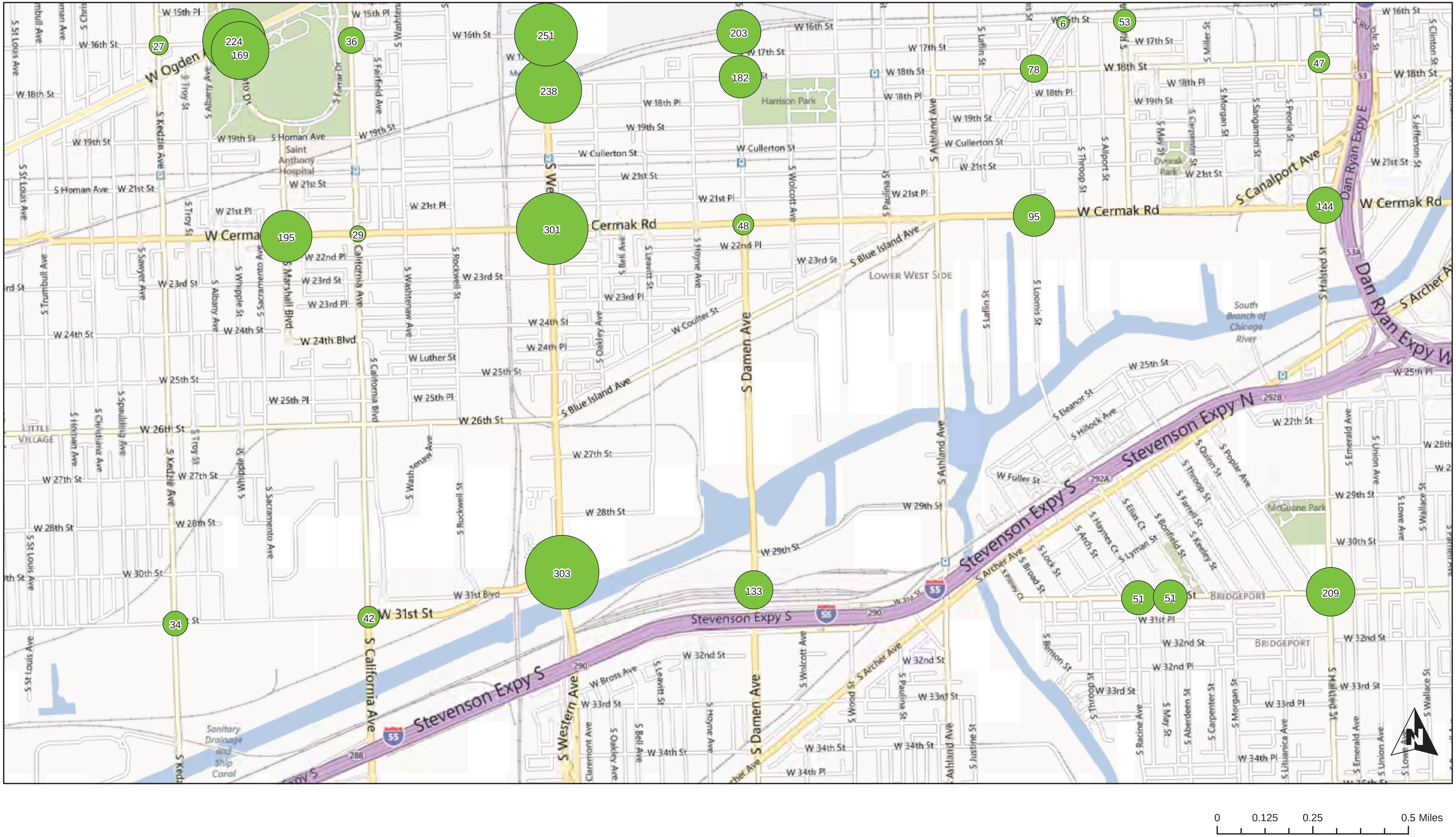
Ashland BRT Off-Corridor Analysis--Diverted Volumes Existing to Build Alternative (PM Peak)

Legend

XX Total Volume Increase during Peak Period

Screenline Percent

- ● 5%
- ● 10%
- ● 25%
- ● 50%



Appendix B-2: Level of Service Analysis

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *June 1, 2013*

Subject: *Intersection Level of Service Methodology*

Prepared by: *CDM Smith, Inc.*

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and FTA, is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue Corridor BRT Project (Build Alternative) are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue Corridor BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

- Construction of 35 median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes and left-turn lanes to accommodate a designated bus lane in each direction

Purpose

The purpose of this memorandum is to describe the methodology used to develop Build Alternative traffic volumes that would result from removing a lane in each direction and removal of left turns along Ashland Avenue. Detailed results tables and schematics are provided in **Attachment A.**

Methodology

The methodology and database tool described below was developed to aid in developing Build Alternative traffic volumes by formalizing a traffic diversion analysis process for Ashland Avenue itself that provides a flexible and modular way of reviewing impacts to traffic volumes on adjacent roadways resulting from implementation of the project.

The Chicago Metropolitan Agency for Planning (CMAP) provided an Existing (No-Build) and Build Alternative model output for this project based on 2010 data. Existing intersection turning movement counts along Ashland Avenue were adjusted using the following methodology:

1. Northbound (NB) and southbound (SB) left, through, and right volumes were adjusted proportional to the change in the corresponding CMAP model link volumes for Ashland Avenue. To account for typical model variations, a floor and a ceiling where applied to the CMAP model link volume ratios. A 0.5 floor was established along most of Ashland Avenue, ensuring that at least half of the traffic is maintained under With Project conditions. A 0.66 floor was established in areas where there are currently three through lanes of traffic, ensuring at least 2/3rds of traffic is represented in With Project conditions. A 0.8 ceiling was establish to along all portions of Ashland Avenue. **Figures 2 and 3** show the northbound and southbound CMAP Build Alternative and No-Build (existing conditions) link volume ratios and the final set of ratios for adjustments using a floor and ceiling.

2. NB and SB left turning volumes were similarly adjusted as described above for through and right volumes. The resulting adjusted volumes were then rerouted using a combination of five possible routing options. For the first four rerouting options the left turn volumes begin on Ashland Avenue and reroute through the adjacent street network, while the last option accounts for additional left turning traffic that reroutes completely off of Ashland Avenue:
    A. Left turns are allowed at the current intersection and no rerouting takes place
    B. Left turning traffic reroutes to a nearby upstream or downstream intersection where lefts are allowed
    C. Left turning traffic reroutes as a right turn off Ashland Avenue and then becomes a eastbound (EB) or Westbound (WB) through at the nearest possible upstream crossing
    D. Left turning traffic reroutes as a right turn off Ashland Avenue and then becomes a EB or WB through at the nearest possible downstream crossing
    E. Left turning traffic reroutes off of Ashland Avenue and shows up as an EB or WB through at the nearest upstream or downstream crossing

3. At cross street locations where a raised median is installed as part of the project, eastbound and westbound left and through volumes were rerouted to the nearest north and south crossing locations.

4. After the above adjustments were made to existing eastbound and westbound volumes, the eastbound and westbound volumes were then adjusted upward, if necessary, to match the proportional changes in the corresponding CMAP model link volumes.

A Microsoft Access database was developed to automate the re-routing process for all intersections along the corridor. Attributes were defined in the database for each cross street along Ashland Avenue detailing whether left turns are allowed at the intersection and its ability to serve as a route for rerouted left turn traffic, including whether the road is a one-way street, T-intersection, alley, shopping center access road, etc.

The database determined for each intersection which of the five possible routing options would be available based on the attributes defined for nearby cross streets. Left turns were then rerouted based on an assumed distribution amongst the five possible routing options, as explained above. While only the results of one scenario of left turn removals is provided in traffic analysis for the Environmental Assessment, the Access database provides the flexibility to analyze different left turn or routing scenarios relatively quickly. As the location of allowed left turns area adjusted, the Access database automatically re-adjusts the possible routing options for the left turning traffic at that intersection and generates new turning movement volumes that can be directly input into the Synchro intersection traffic model.

Figure 2: CMAP Model With Project/Existing Conditions Link Volume Ratios on Ashland Avenue

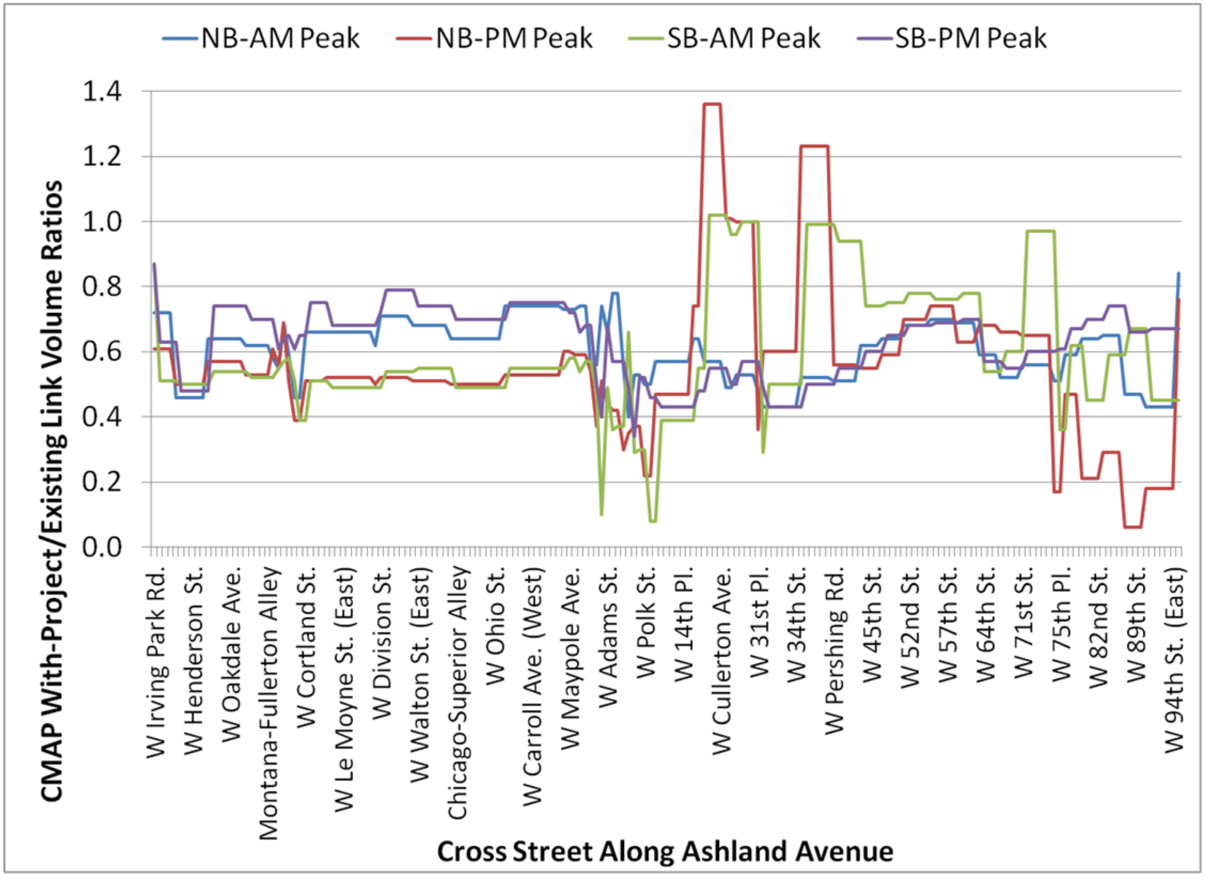
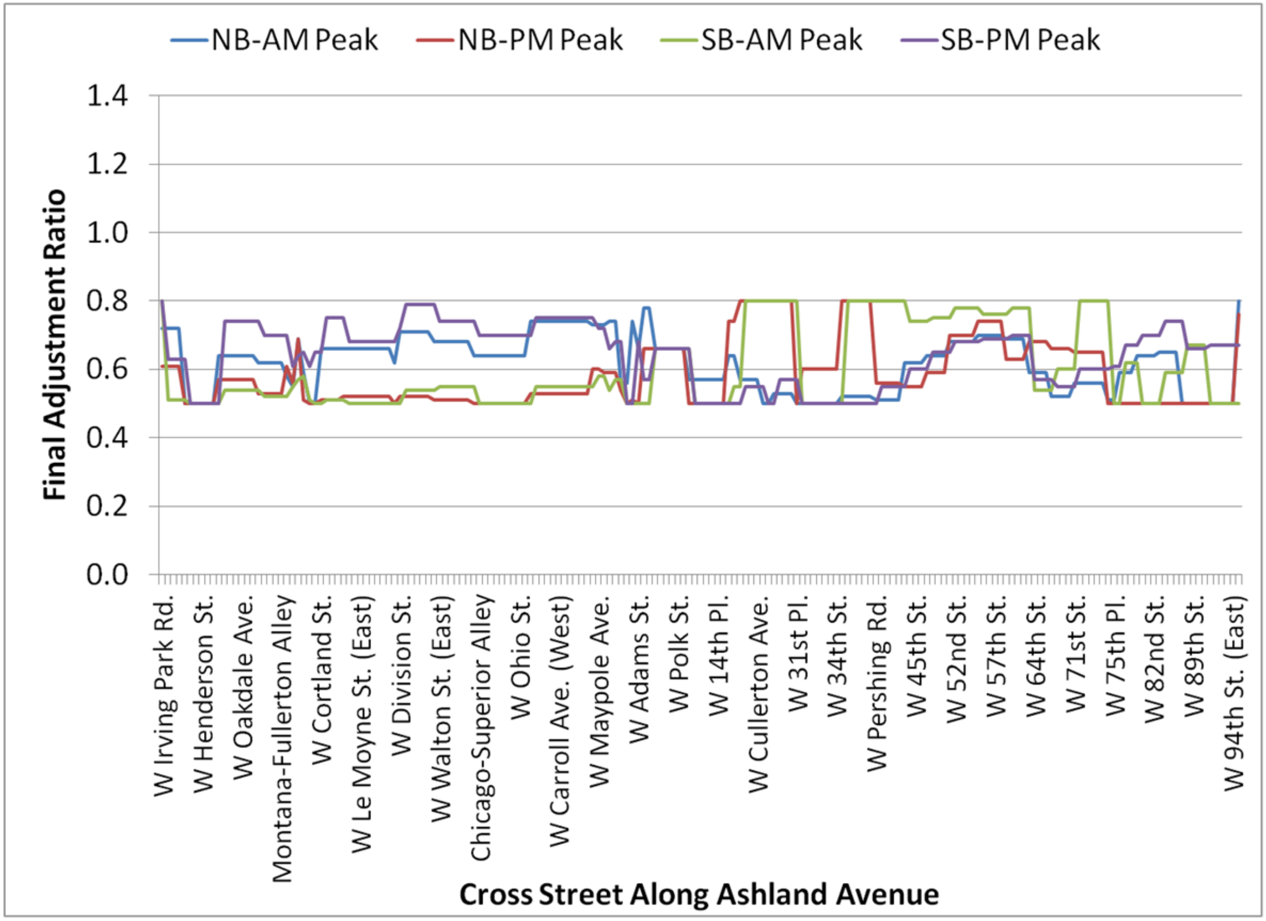
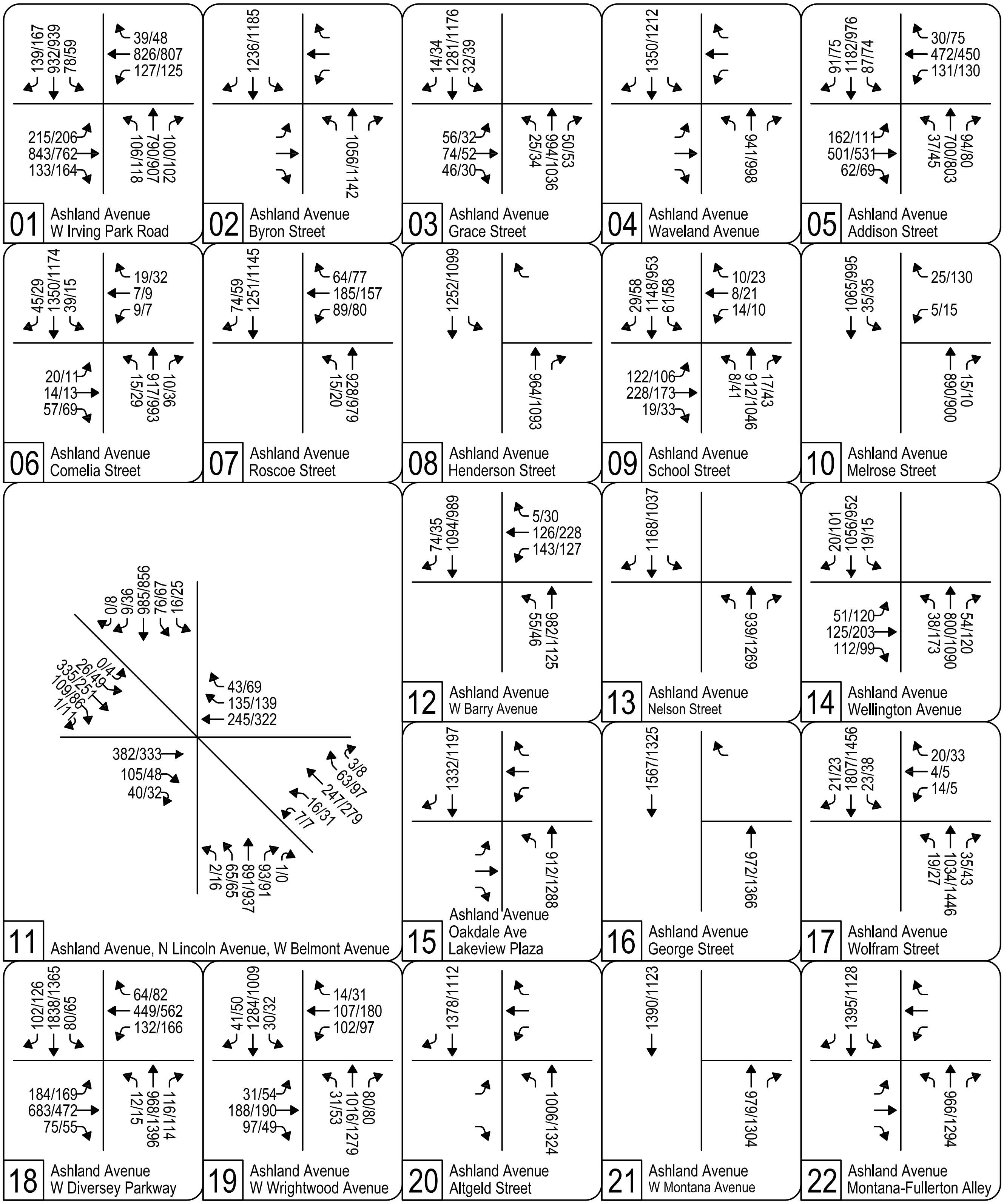


Figure 3: Final Adjusted With Project/Existing Conditions Link Volume Ratios on Ashland Avenue

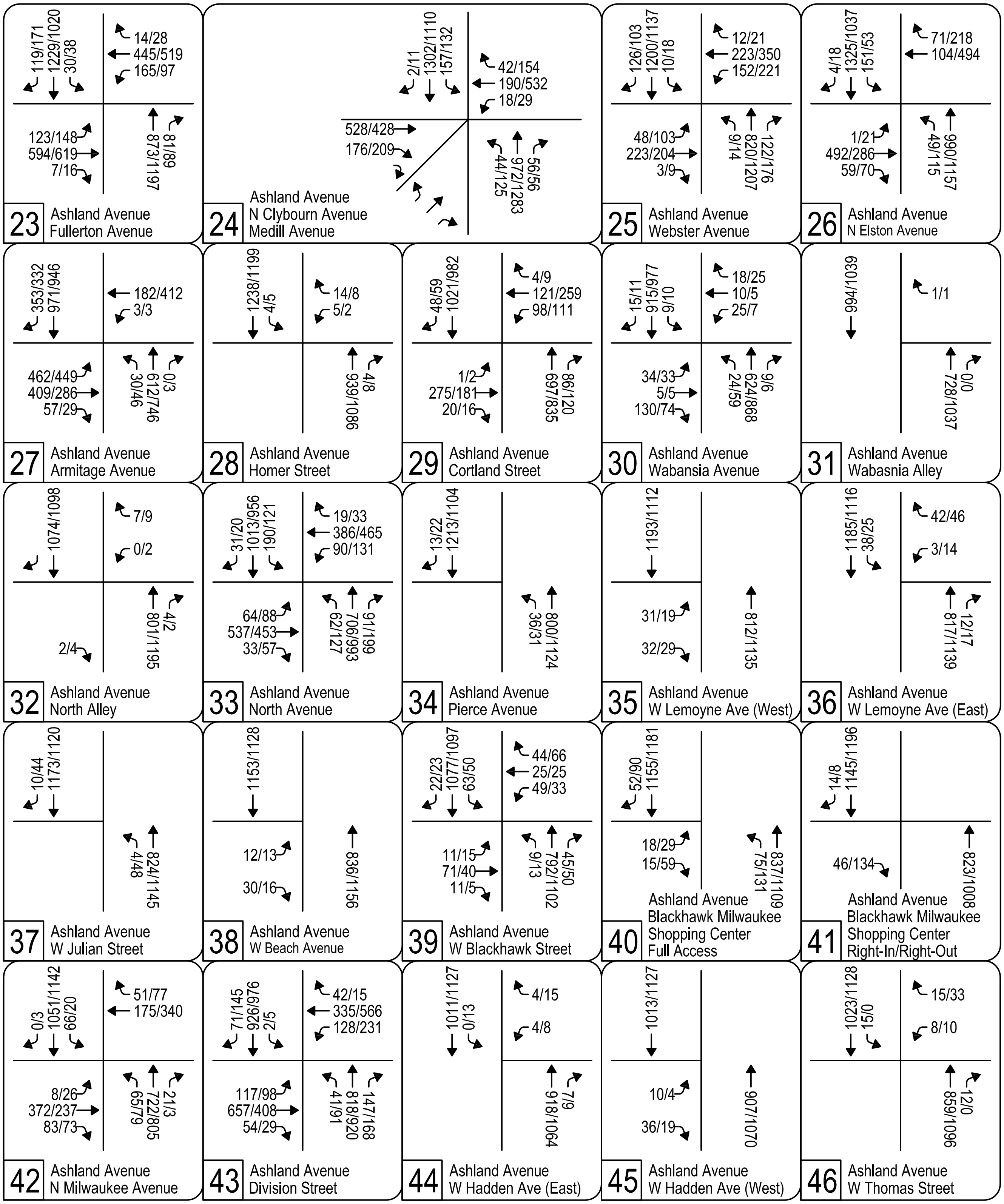


Existing Volume Schematics



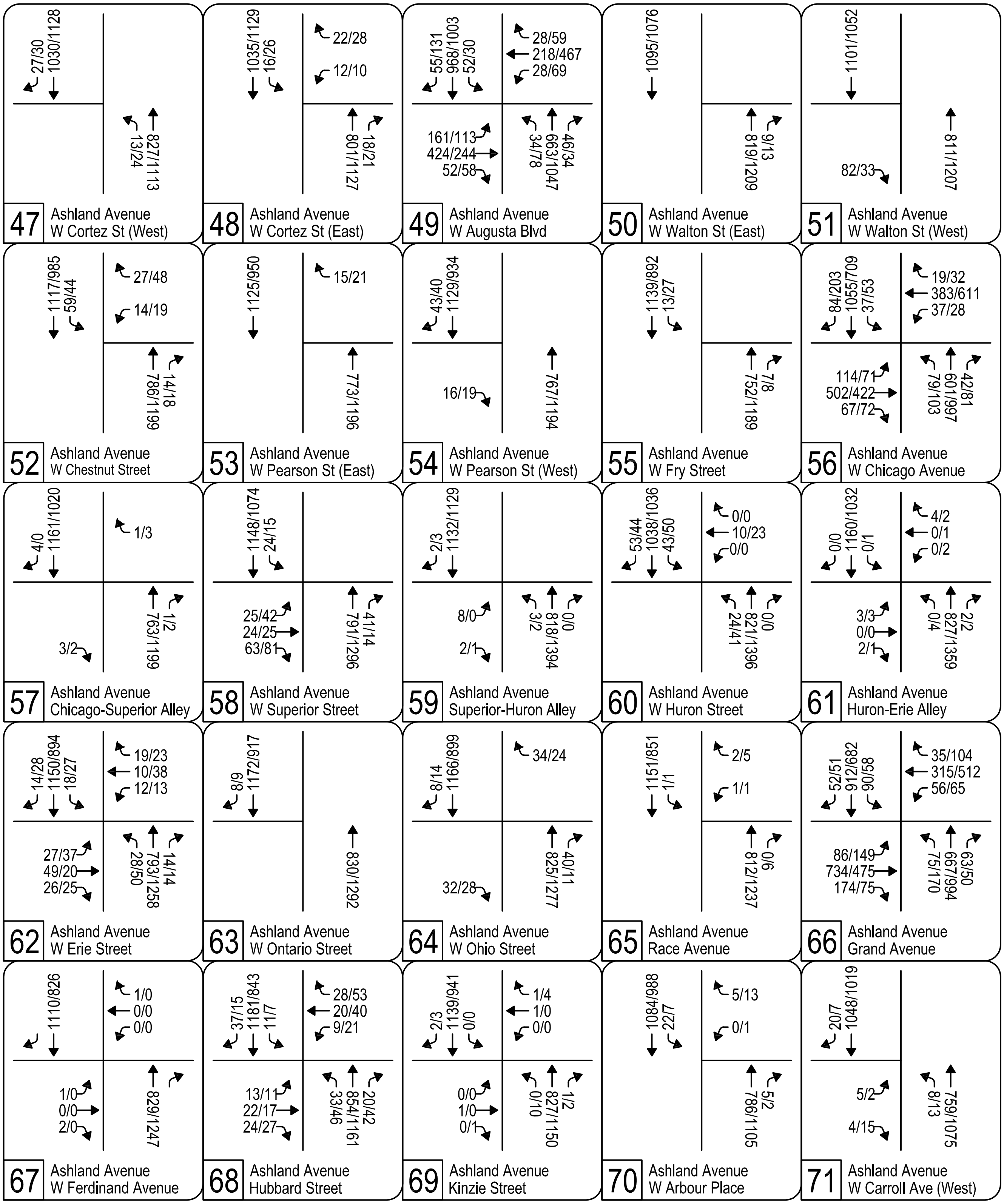
Existing Conditions

Legend: AM/PM Peak Hour Volumes (vph)



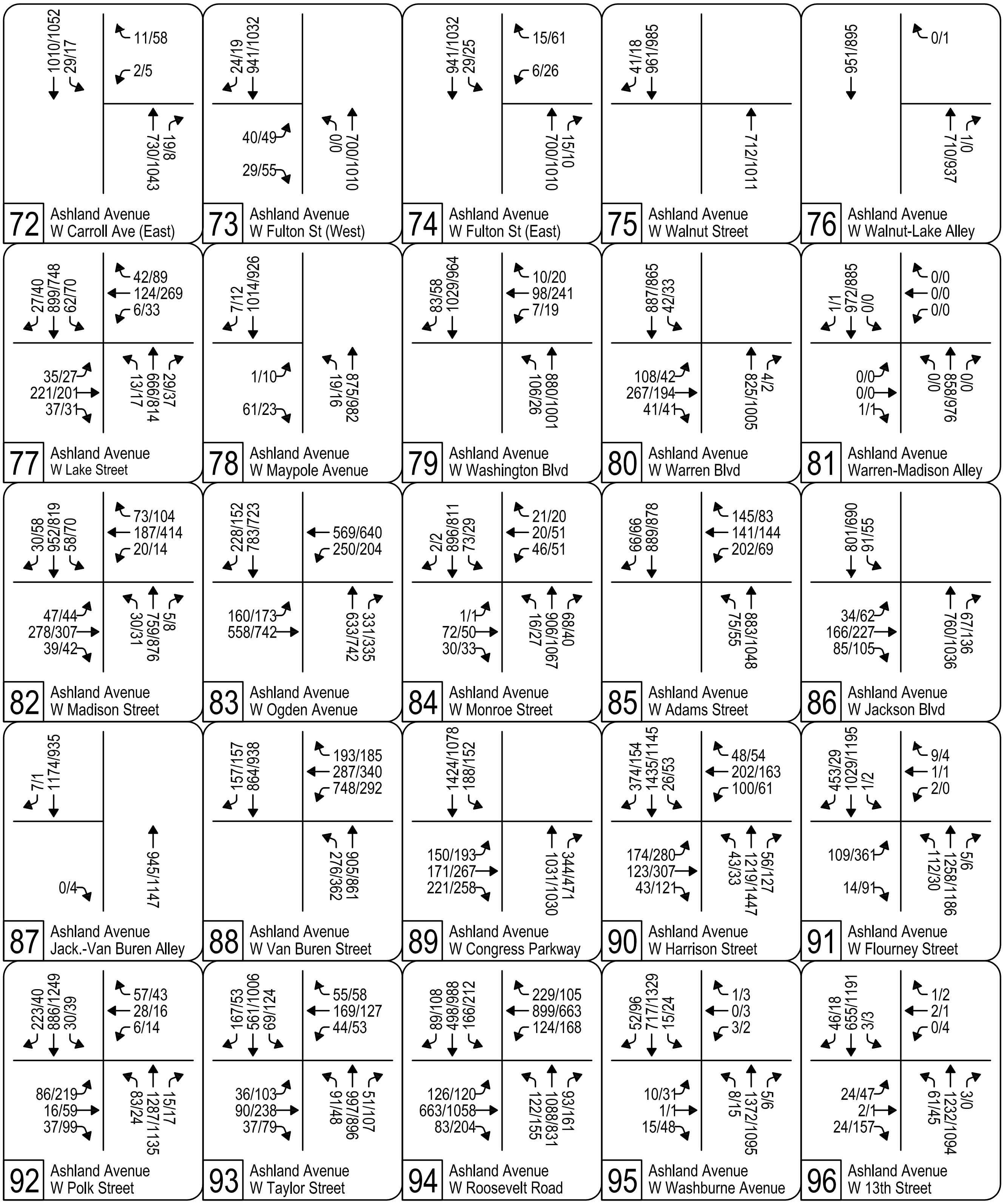
Existing Conditions

Legend: AM/PM Peak Hour Volumes (vph)



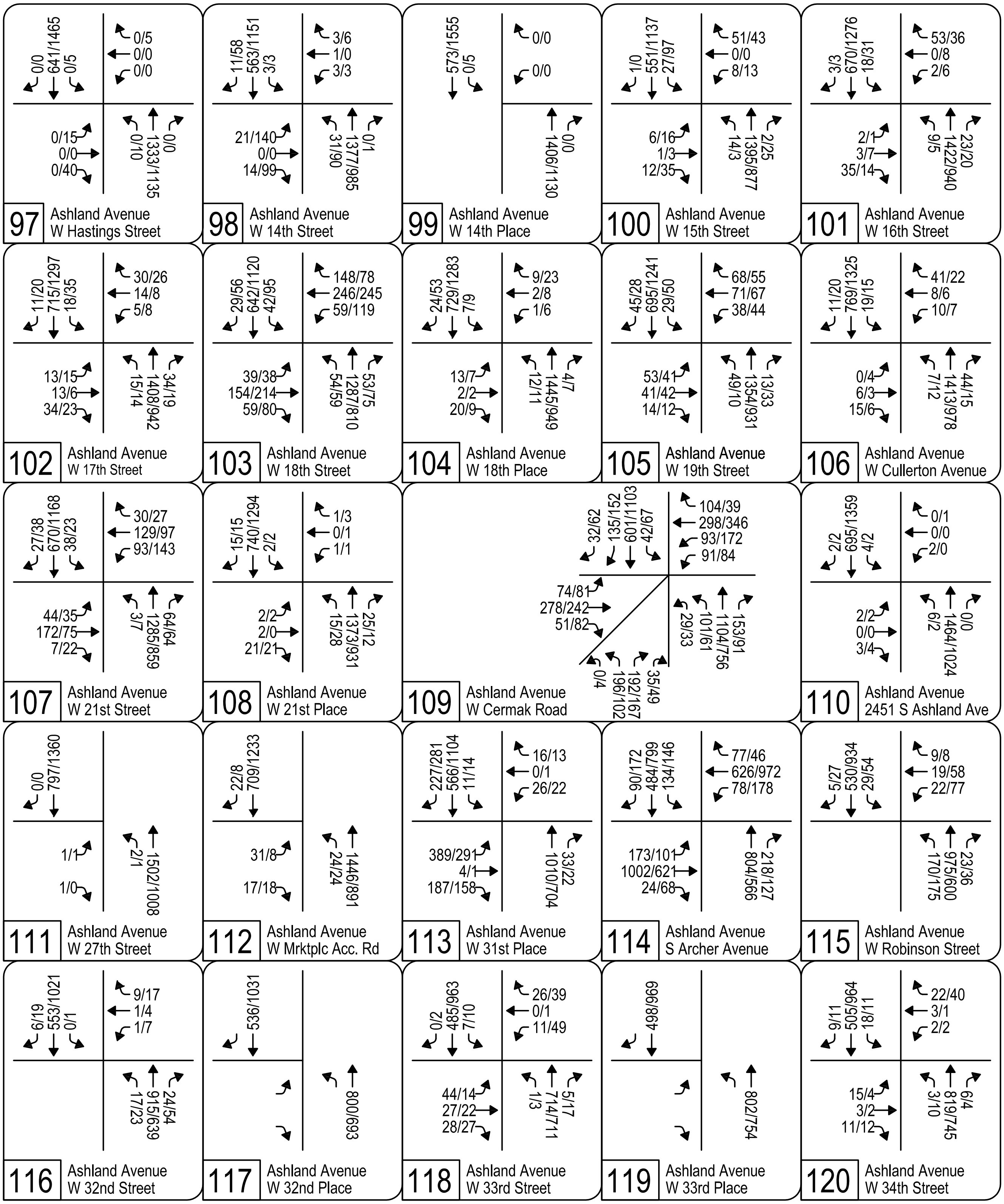
Existing Conditions

Legend: AM/PM Peak Hour Volumes (vph)



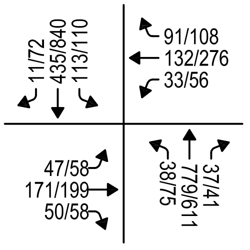
Existing Conditions

Legend: AM/PM Peak Hour Volumes (vph)

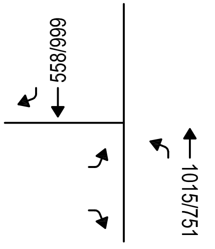


Existing Conditions

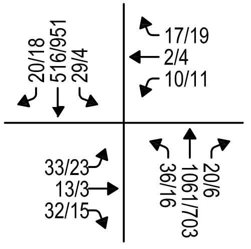
Legend: AM/PM Peak Hour Volumes (vph)



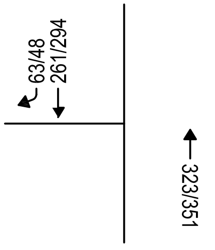
121
Ashland Avenue
W 35th Street



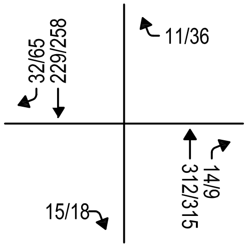
122
Ashland Avenue
W 36th Street



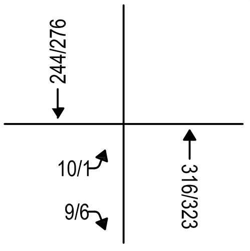
123
Ashland Avenue
W 37th Street



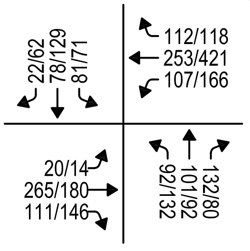
124
Ashland Avenue
W 37th Place



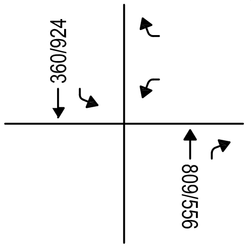
125
Ashland Avenue
W 38th Street



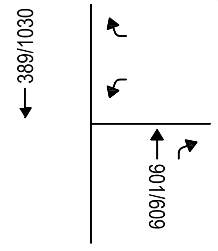
126
Ashland Avenue
W 38th Place



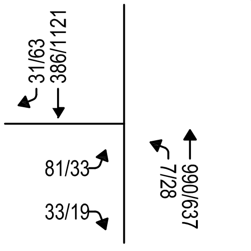
127
Ashland Avenue
W Pershing Road



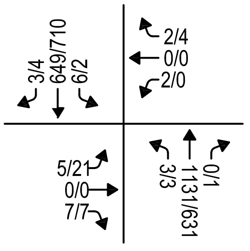
128
Ashland Avenue
W 41st Street



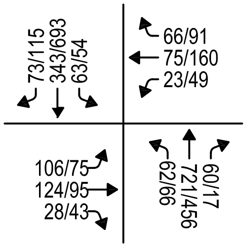
129
Ashland Avenue
W 42nd Street (East)



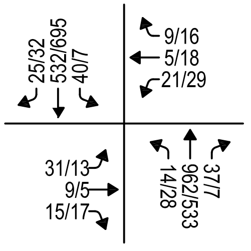
130
Ashland Avenue
W 42nd Street (West)



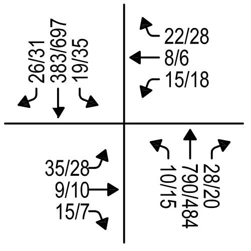
131
Ashland Avenue
W 42nd Place



132
Ashland Avenue
W 43rd Place



133
Ashland Avenue
W 44th Street



134
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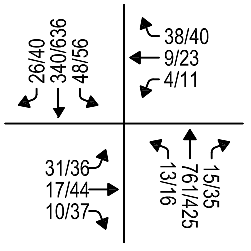
W 45th Street



135
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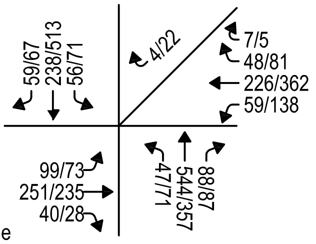
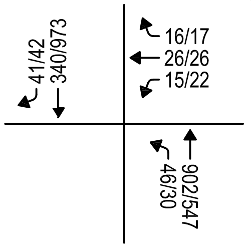


136
Ashland Avenue
W 47th Street
S McDowell Avenue



137
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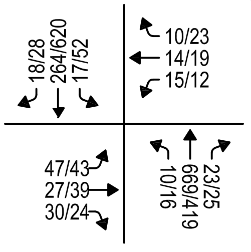
W 48th Street



138
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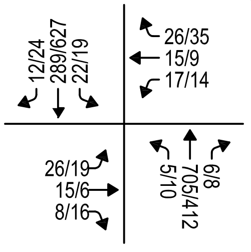
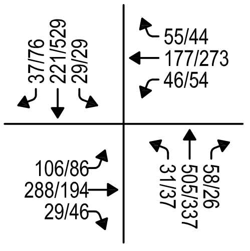
W 49th Street



139
Ashland Avenue
S 50th Street



140
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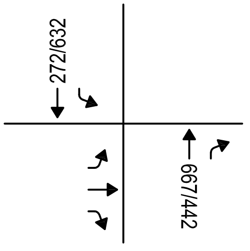
W 51st Street



141
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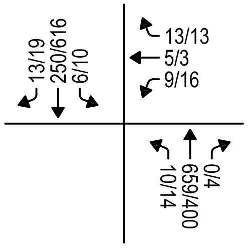
W 52nd Street



142
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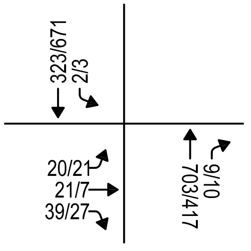
W 53rd Street



143
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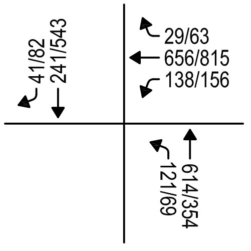
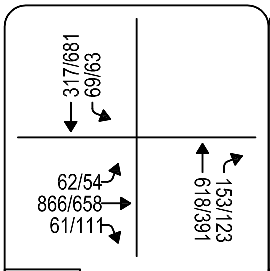
W 54th Street



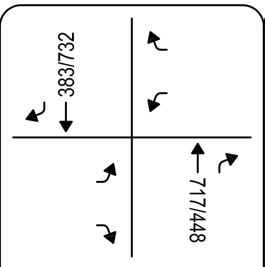
144
Ashland Avenue
W Garfield Blvd (WB)

Existing Conditions

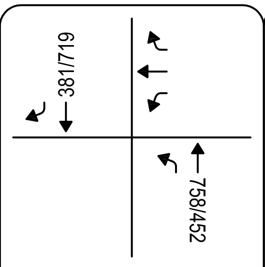
Legend: AM/PM Peak Hour Volumes (vph)



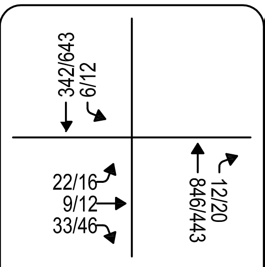
145 Ashland Avenue
W Garfield Blvd (EB)



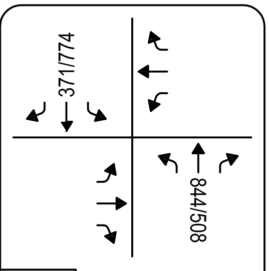
146 Ashland Avenue
Garfield-56th Alley



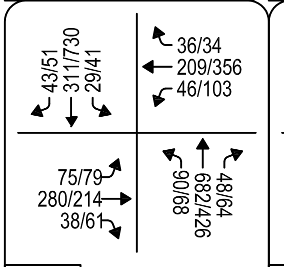
147 Ashland Avenue
W 56th Street



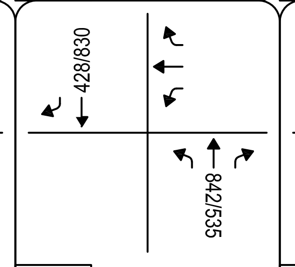
148 Ashland Avenue
W 57th Street



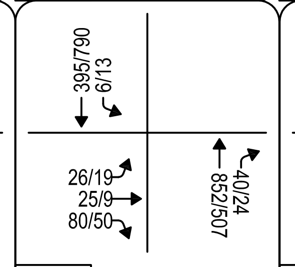
149 Ashland Avenue
W 58th Street



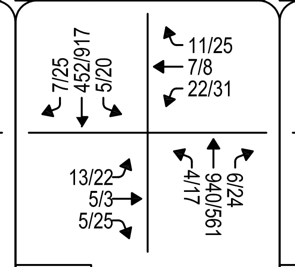
150 Ashland Avenue
W 59th Street



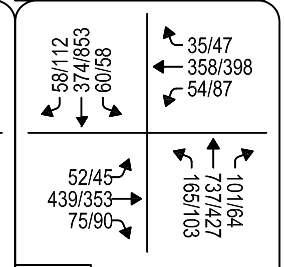
151 Ashland Avenue
W 60th Street



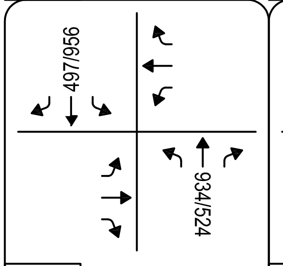
152 Ashland Avenue
W 61st Street



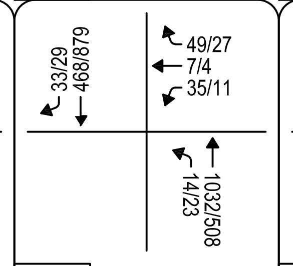
153 Ashland Avenue
W 62nd Street



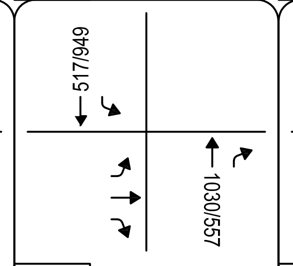
154 Ashland Avenue
W 63rd Street



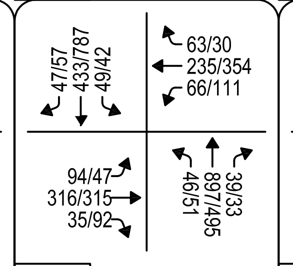
155 Ashland Avenue
W 64th Street



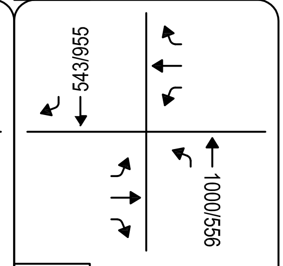
156 Ashland Avenue
W 65th Street



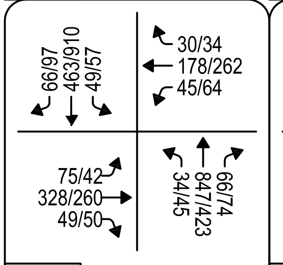
157 Ashland Avenue
W 66th Street



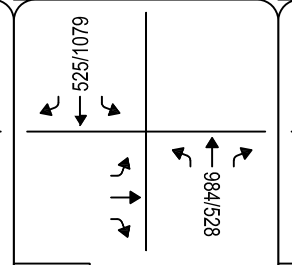
158 Ashland Avenue
W Marquette Road



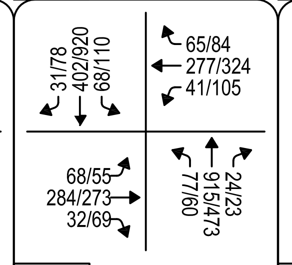
159 Ashland Avenue
W 68th Street



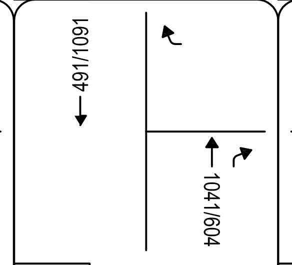
160 Ashland Avenue
W 69th Street



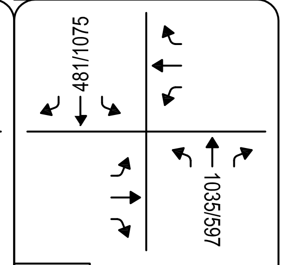
161 Ashland Avenue
W 70th Street



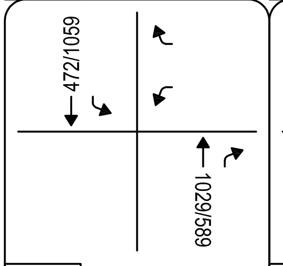
162 Ashland Avenue
W 71st Street



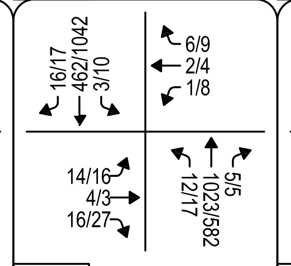
163 Ashland Avenue
W 71st Place



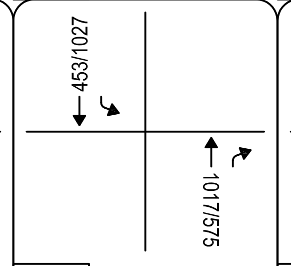
164 Ashland Avenue
W 72nd Street



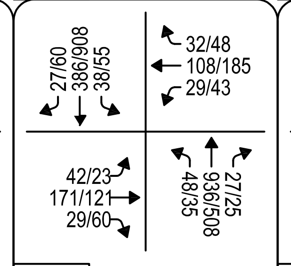
165 Ashland Avenue
W 72nd Place



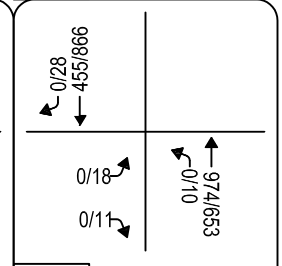
166 Ashland Avenue
W 73rd Street



167 Ashland Avenue
W 73rd Place



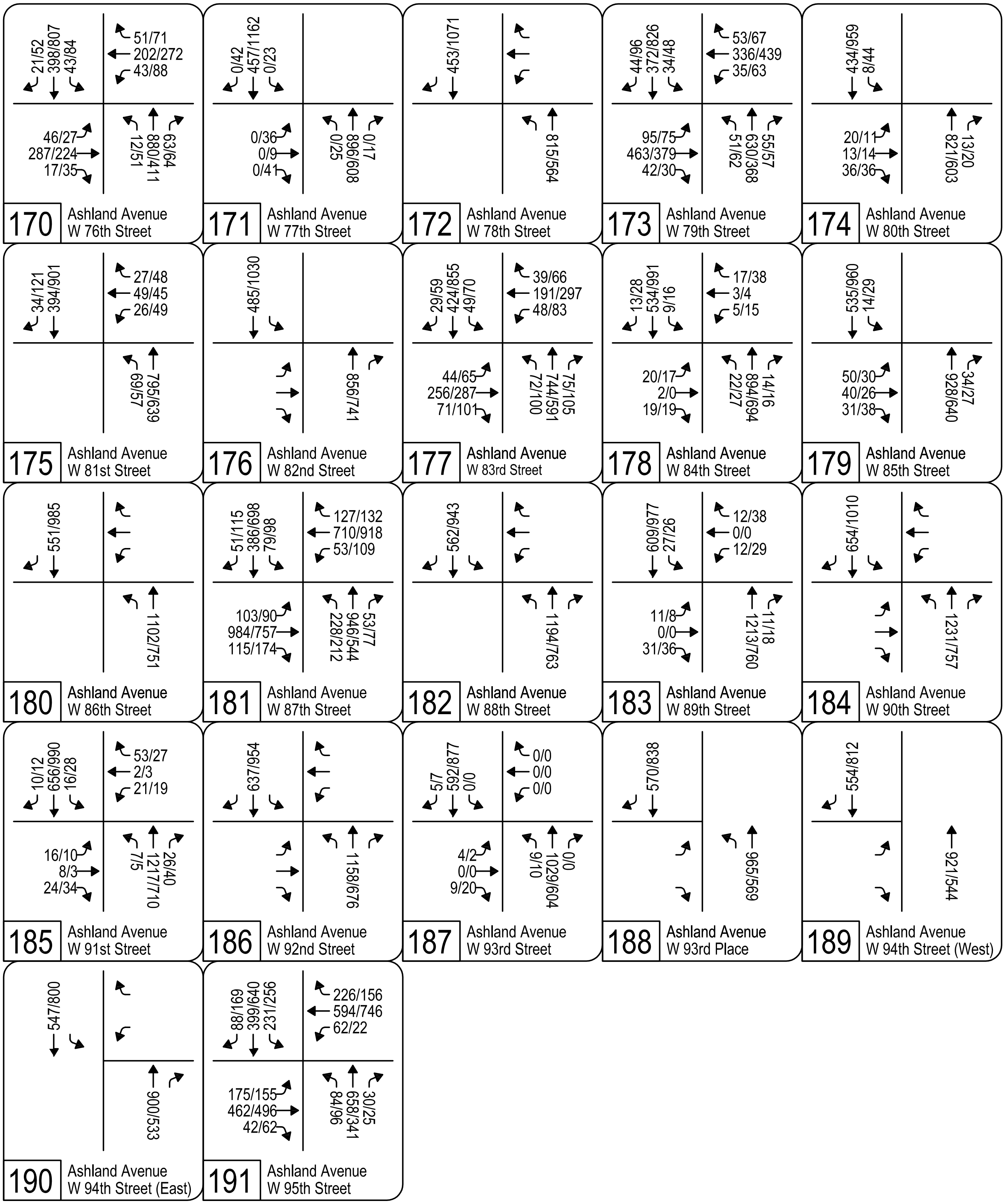
168 Ashland Avenue
W 74th Street



169 Ashland Avenue
W 75th Place

Existing Conditions

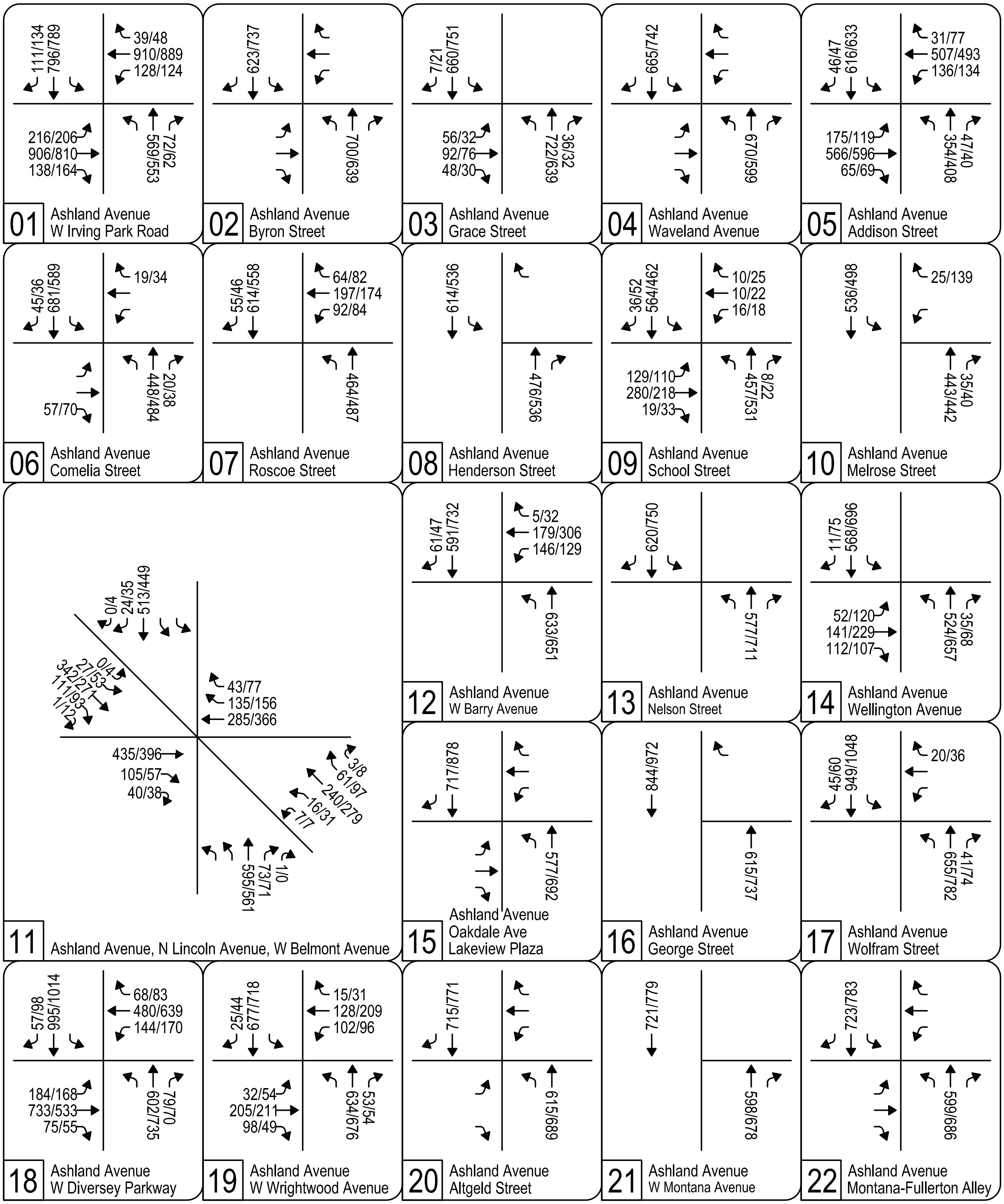
Legend: AM/PM Peak Hour Volumes (vph)



Existing Conditions

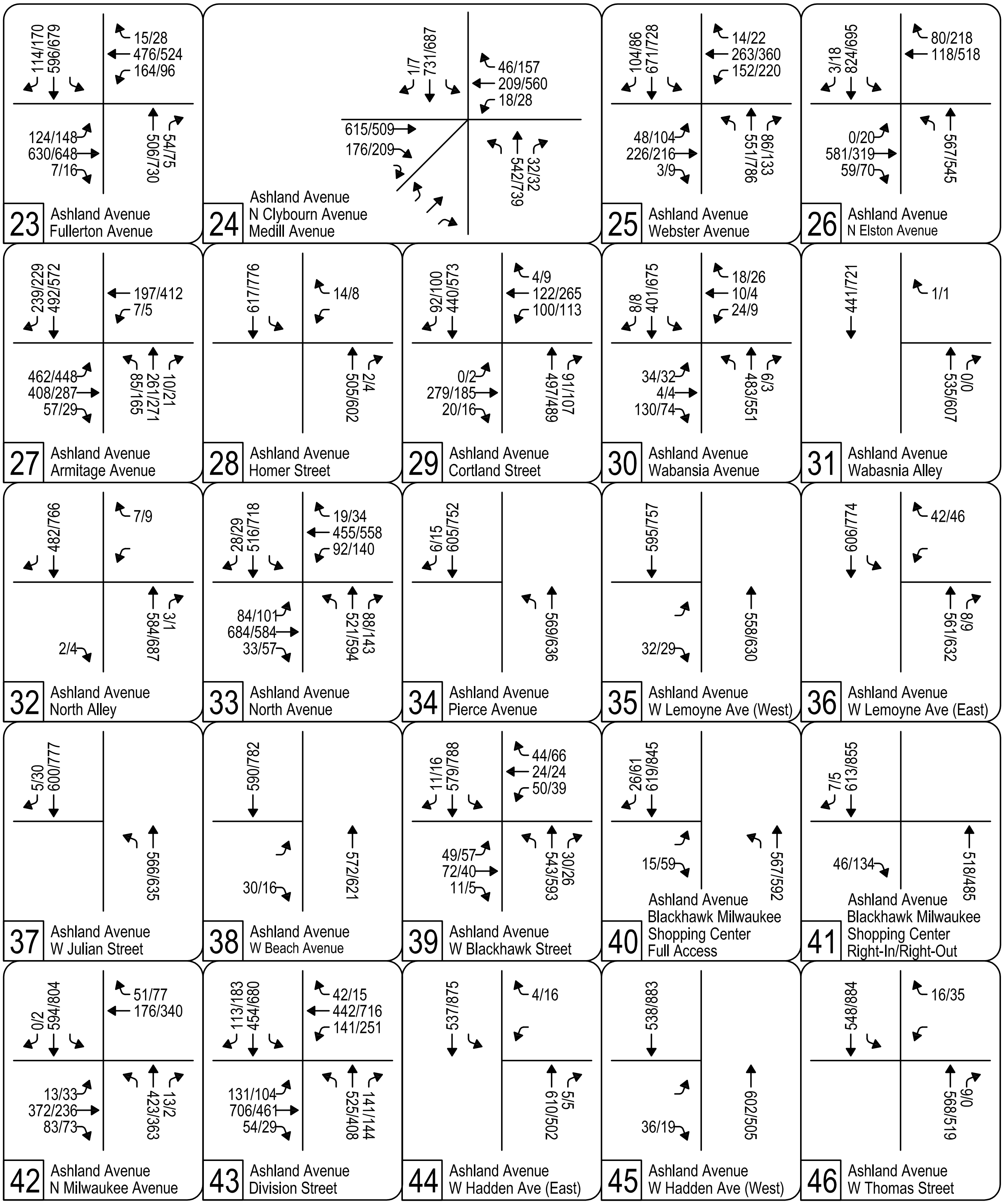
Legend: AM/PM Peak Hour Volumes (vph)

Build Alternative Volume Schematics



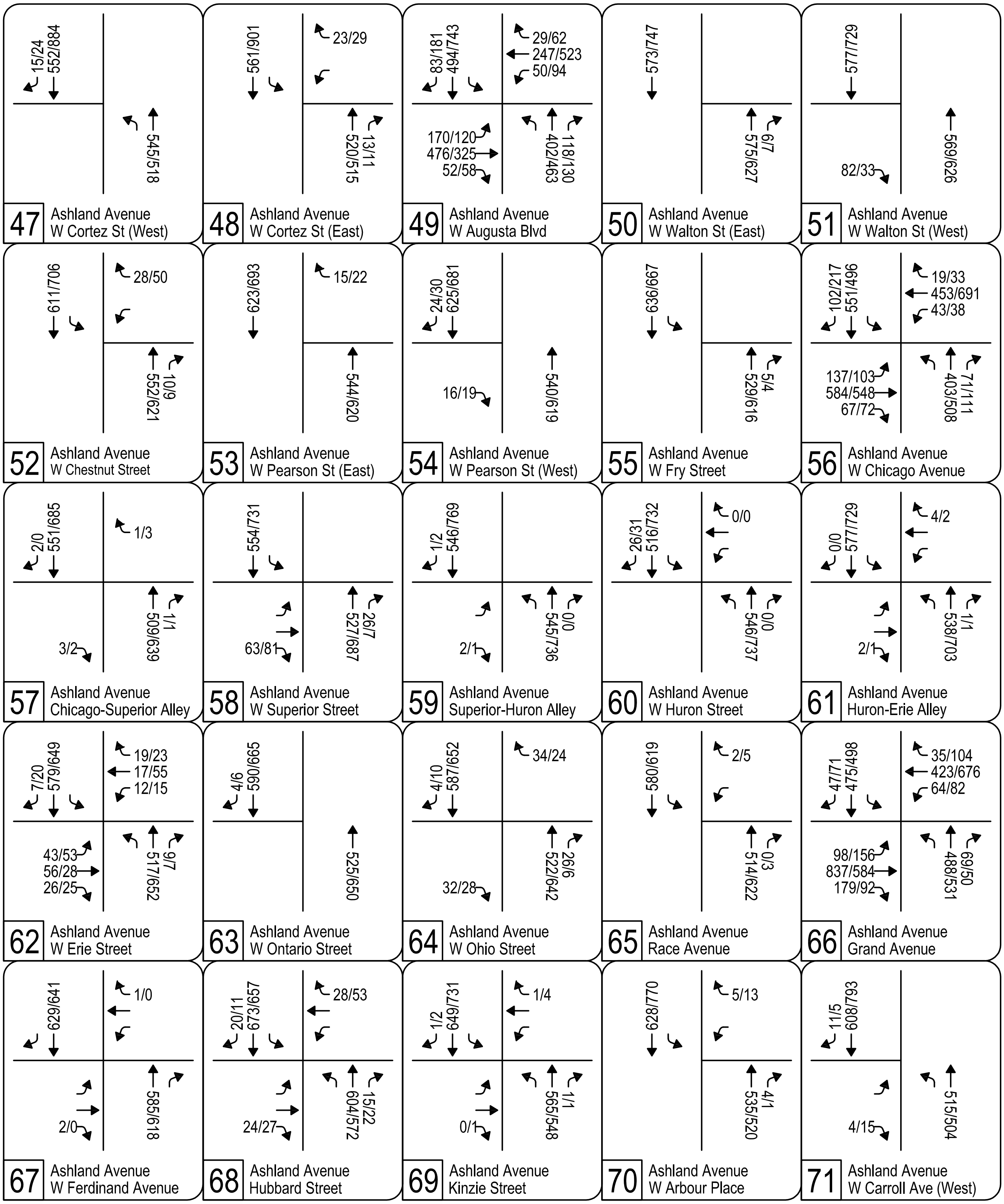
Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)



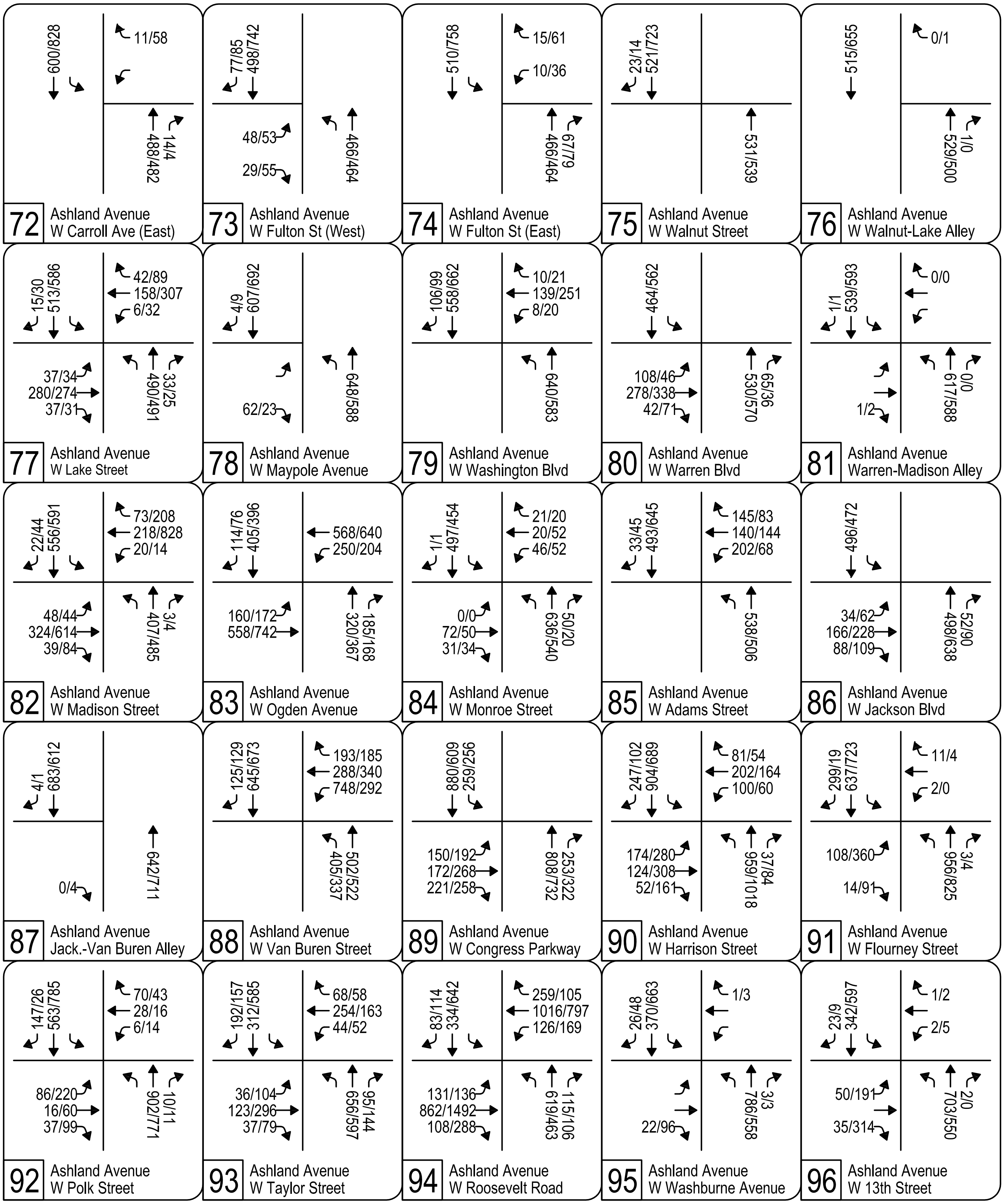
Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)


47 Ashland Avenue W Cortez St (West)
15/24
552/884
545/518
48 Ashland Avenue W Cortez St (East)
561/901
23/29
520/515
13/11
49 Ashland Avenue W Augusta Blvd
83/181
494/743
29/62
247/523
50/94
170/120
476/325
52/58
402/463
118/130
50 Ashland Avenue W Walton St (East)
573/747
575/627
6/7
51 Ashland Avenue W Walton St (West)
577/729
82/33
569/626
52 Ashland Avenue W Chestnut Street
611/706
28/50
552/621
10/9
53 Ashland Avenue W Pearson St (East)
623/693
15/22
544/620
54 Ashland Avenue W Pearson St (West)
24/30
625/681
16/19
540/619
55 Ashland Avenue W Fry Street
636/667
529/616
5/4
56 Ashland Avenue W Chicago Avenue
102/217
551/496
19/33
453/691
43/38
137/103
584/548
67/72
403/508
71/111
57 Ashland Avenue Chicago-Superior Alley
2/0
551/685
1/3
3/2
509/639
1/1
58 Ashland Avenue W Superior Street
554/731
63/81
527/687
26/7
59 Ashland Avenue Superior-Huron Alley
1/2
546/769
2/1
545/736
0/0
60 Ashland Avenue W Huron Street
26/31
516/732
0/0
546/737
0/0
61 Ashland Avenue Huron-Erie Alley
0/0
577/729
4/2
2/1
538/703
1/1
62 Ashland Avenue W Erie Street
7/20
579/649
19/23
17/55
12/15
43/53
56/28
26/25
517/652
9/7
63 Ashland Avenue W Ontario Street
4/6
590/665
525/650
64 Ashland Avenue W Ohio Street
4/10
587/652
34/24
32/28
522/642
26/6
65 Ashland Avenue Race Avenue
580/619
2/5
514/622
0/3
66 Ashland Avenue Grand Avenue
47/71
475/498
35/104
423/676
64/82
98/156
837/584
179/92
488/531
69/50
67 Ashland Avenue W Ferdinand Avenue
629/641
1/0
2/0
585/618
68 Ashland Avenue Hubbard Street
20/11
673/657
28/53
24/27
604/572
15/22
69 Ashland Avenue Kinzie Street
1/2
649/731
1/4
0/1
565/548
1/1
70 Ashland Avenue W Arbour Place
628/770
5/13
535/520
4/1
71 Ashland Avenue W Carroll Ave (West)
11/5
608/793
4/15
515/504

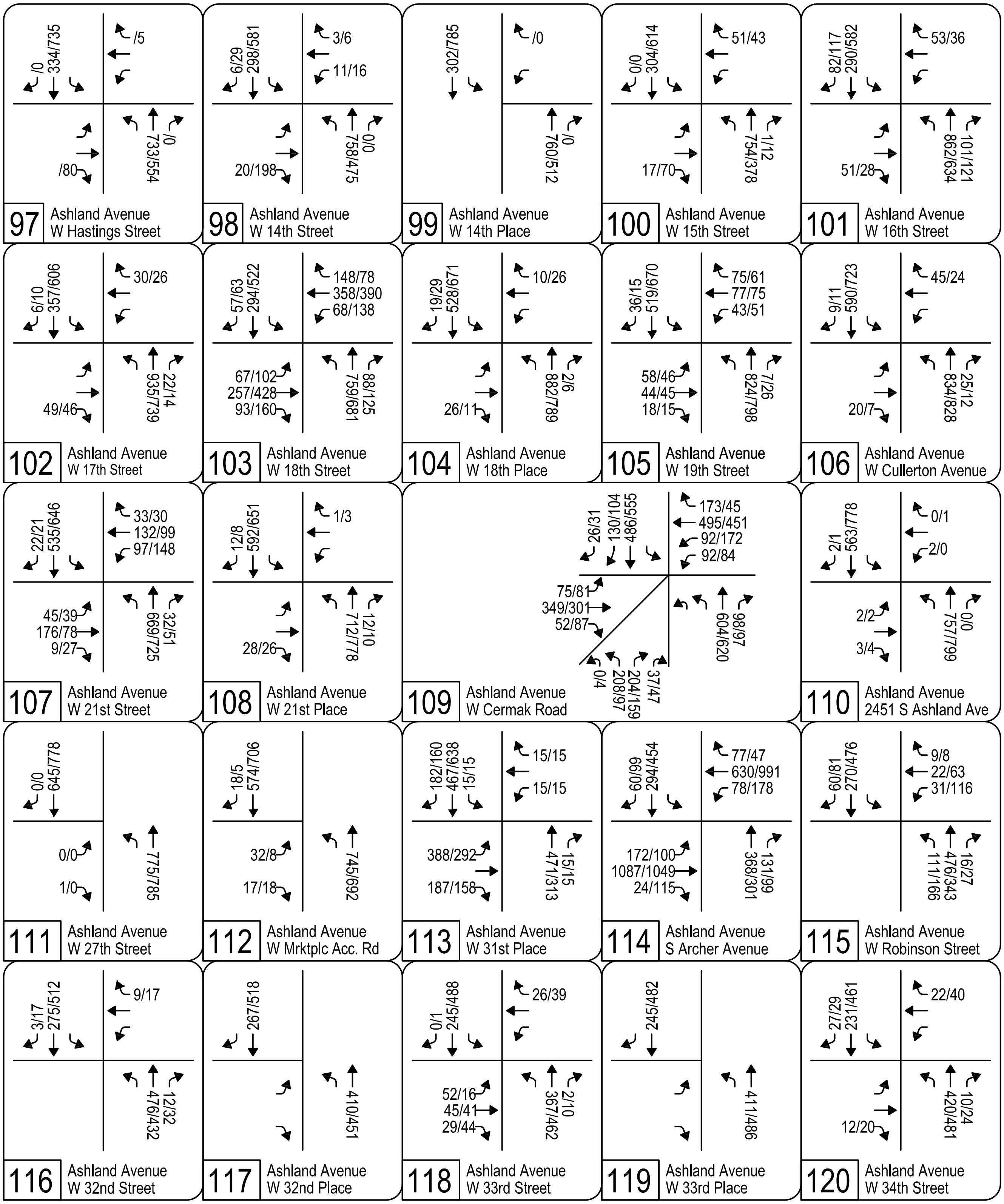
Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)



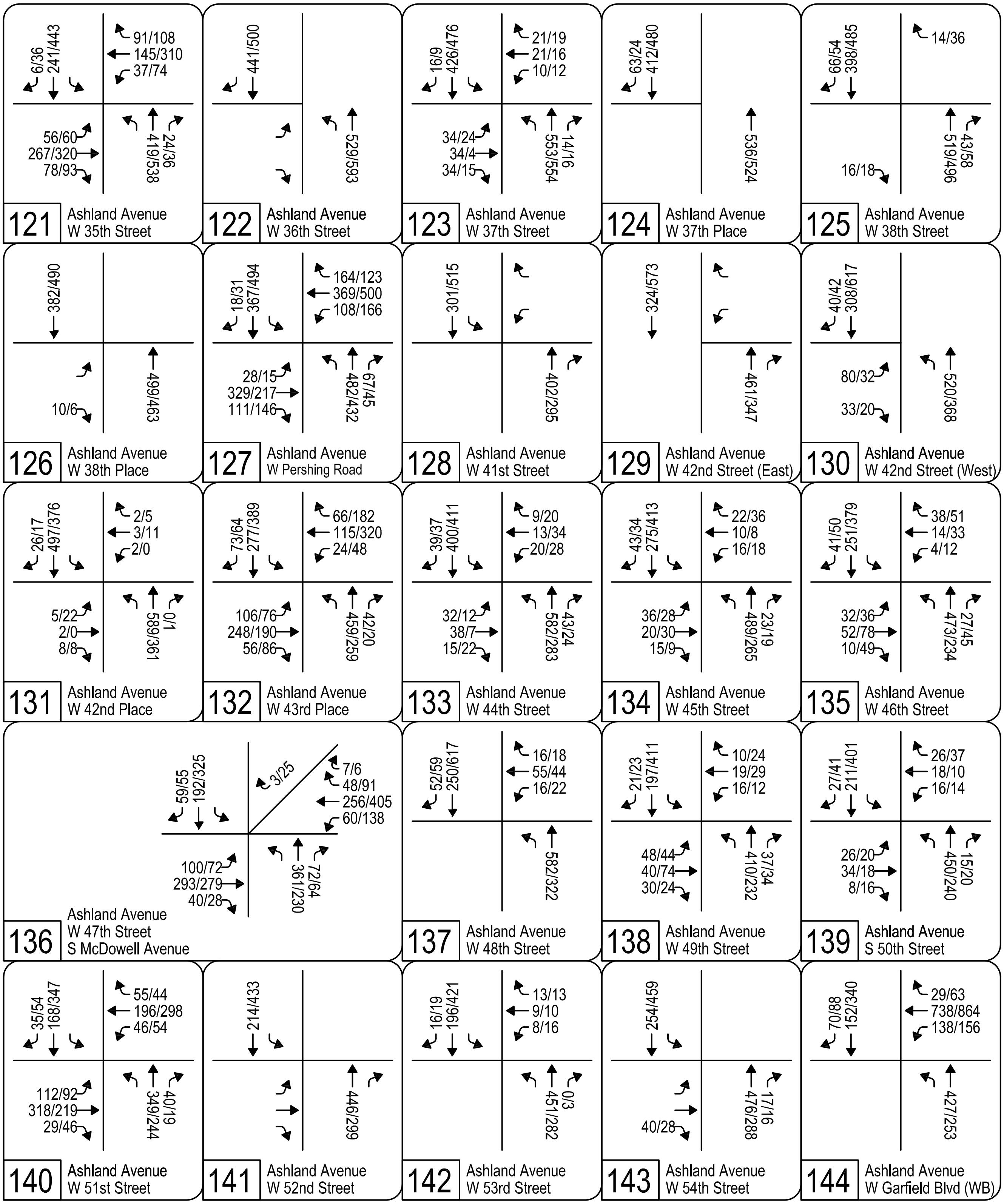
Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)



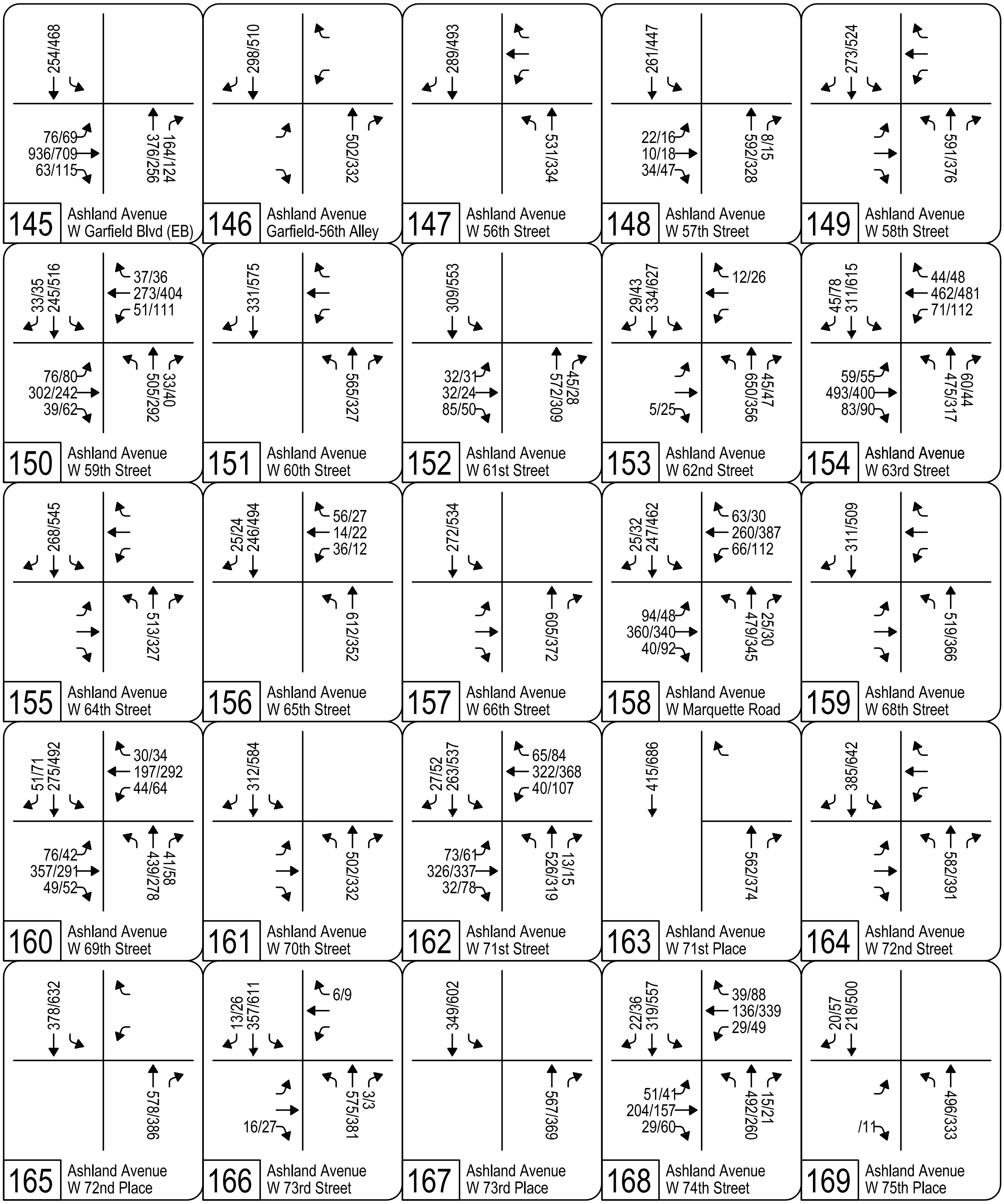
Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)



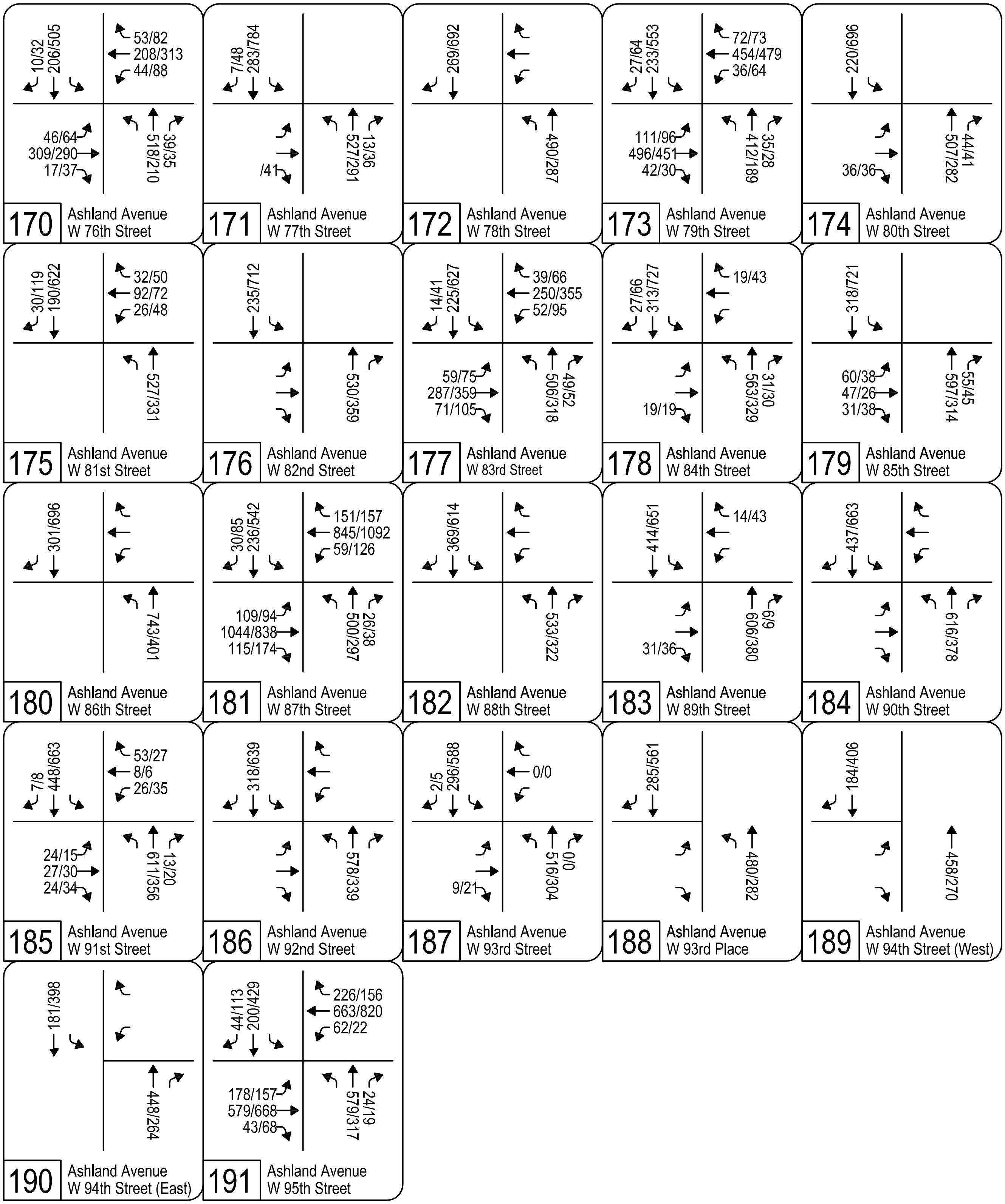
Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)



Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)


170 Ashland Avenue W 76th Street
10/32
206/505
53/82
208/313
44/88
46/64
309/290
17/37
518/210
39/35
171 Ashland Avenue W 77th Street
7/48
283/784
/41
527/291
13/36
172 Ashland Avenue W 78th Street
269/692
490/287
173 Ashland Avenue W 79th Street
27/64
233/553
72/73
454/479
36/64
111/96
496/451
42/30
412/189
35/28
174 Ashland Avenue W 80th Street
220/696
36/36
507/282
44/41
175 Ashland Avenue W 81st Street
30/119
190/622
32/50
92/72
26/48
527/331
176 Ashland Avenue W 82nd Street
235/712
530/359
177 Ashland Avenue W 83rd Street
14/41
225/627
39/66
250/355
52/95
59/75
287/359
71/105
506/318
49/52
178 Ashland Avenue W 84th Street
27/66
313/727
19/43
19/19
563/329
31/30
179 Ashland Avenue W 85th Street
318/721
60/38
47/26
31/38
597/314
55/45
180 Ashland Avenue W 86th Street
301/696
743/401
181 Ashland Avenue W 87th Street
30/85
236/542
151/157
845/1092
59/126
109/94
1044/838
115/174
500/297
26/38
182 Ashland Avenue W 88th Street
369/614
533/322
183 Ashland Avenue W 89th Street
414/651
14/43
31/36
606/380
6/9
184 Ashland Avenue W 90th Street
437/663
616/378
185 Ashland Avenue W 91st Street
7/8
448/663
53/27
8/6
26/35
24/15
27/30
24/34
611/356
13/20
186 Ashland Avenue W 92nd Street
318/639
578/339
187 Ashland Avenue W 93rd Street
2/5
296/588
0/0
9/21
516/304
0/0
188 Ashland Avenue W 93rd Place
285/561
480/282
189 Ashland Avenue W 94th Street (West)
184/406
458/270
190 Ashland Avenue W 94th Street (East)
181/398
448/264
191 Ashland Avenue W 95th Street
44/113
200/429
226/156
663/820
62/22
178/157
579/668
43/68
579/317
24/19

Build Conditions

Legend: AM/PM Peak Hour Volumes (vph)

Level of Service Results Tables

ID	Location	Existing Conditions AM		Existing Conditions PM		Build Conditions AM		Build Conditions PM		Build with Mitigations Conditions AM		Build with Mitigations Conditions PM		Build AM Change	Build PM Change	Build with Mitigations AM Change	Build with Mitigations PM Change
1001	W Irving Park Rd.	D	46.2	D	38.7	F	91.4	E	64.9	F	91.3	E	65.3	+45.2	+26.2	+45.1	+26.6
1003	W Grace St.	B	19.5	B	16.9	C	32.0	C	27.4	C	32.6	C	26.7	+12.5	+10.5	+13.1	+9.8
1005	W Addison St.	D	51.0	C	25.4	E	66.0	D	49.4	D	41.4	C	30.8	+15.0	+24.0	-9.6	+5.4
1007	W Roscoe St.	C	22.4	B	19.7	C	27.3	C	20.6	C	28.2	C	21.4	+4.9	+0.9	+5.8	+1.7
1009	W School St.	C	20.5	B	17.9	C	23.6	B	19.9	C	26.2	C	21.9	+3.1	+2.0	+5.7	+4.0
1011	W Belmont Ave./ N. Lincoln Ave.	F	128.2	F	84.8	F	162.7	F	127.3	F	80.9	E	65.2	+34.5	+42.5	-47.3	-19.6
1012	W Barry Ave.	B	15.8	B	18.3	C	22.4	D	38.1	C	22.8	D	38.9	+6.6	+19.8	+7.0	+20.6
1014	W Wellington Ave.	C	21.8	C	22.0	C	23.7	C	30.7	C	24.0	C	31.6	+1.9	+8.7	+2.2	+9.6
1018	W Diversey Pkwy.	F	131.7	F	115.6	F	225.1	F	225.6	F	153.6	F	159.1	+93.4	+110.0	+21.9	+43.5
1019	W Wrightwood Ave.	B	13.8	B	17.8	D	45.0	D	47.8	D	47.1	D	47.8	+31.2	+30.0	+33.3	+30.0
1023	W Fullerton Ave.	E	56.7	D	48.4	D	38.5	D	49.9	D	38.3	D	51.4	-18.2	+1.5	-18.4	+3.0
1024	N Clybourn Ave.	E	74.9	E	73.5	E	60.7	D	48.7	D	48.7	D	48.1	-14.2	-24.8	-26.2	-25.4
1025	W Webster Ave.	C	21.3	C	23.2	C	30.5	E	72.5	C	23.0	D	44.6	+9.2	+49.3	+1.7	+21.4
1026	N Elston Ave.	E	76.6	C	33.7	D	50.9	C	27.7	D	51.8	C	28.2	-25.7	-6.0	-24.8	-5.5
1027	W Armitage Ave.	D	41.3	D	37.9	D	40.1	E	62.2	D	40.1	E	62.1	-1.2	+24.3	-1.2	+24.2
1029	W Cortland St.	B	18.4	C	20.4	E	61.5	E	68.0	E	61.5	E	68.0	+43.1	+47.6	+43.1	+47.6
1030	W Wabansia Ave.	A	8.1	A	5.7	B	12.6	B	10.0	B	12.6	B	10.0	+4.5	+4.3	+4.5	+4.3
1033	W North Ave.	D	40.9	D	39.2	D	42.0	E	59.6	D	42.0	E	59.8	+1.1	+20.4	+1.1	+20.6
1039	W Blackhawk St.	B	15.3	B	17.3	B	14.3	B	14.2	B	14.4	B	14.4	-1.0	-3.1	-0.9	-2.9
1042	N Milwaukee Ave.	C	27.5	C	29.6	C	30.3	C	32.1	C	30.3	C	32.1	+2.8	+2.5	+2.8	+2.5
1043	W Division St.	C	21.6	C	22.9	C	27.7	C	31.4	C	28.1	C	30.8	+6.1	+8.5	+6.5	+7.9
1049	W Augusta Blvd.	B	17.8	C	20.6	C	33.6	F	102.9	C	26.5	D	50.5	+15.8	+82.3	+8.7	+29.9
1056	W Chicago Ave.	C	22.3	C	28.9	B	16.5	C	22.1	B	16.5	C	22.1	-5.8	-6.8	-5.8	-6.8
1062	W Erie St.	A	9.7	A	8.3	B	12.7	B	13.0	B	12.7	B	13.0	+3.0	+4.7	+3.0	+4.7
1066	W Grand Ave.	C	26.9	C	29.4	C	26.5	C	29.7	C	26.5	C	29.7	-0.4	+0.3	-0.4	+0.3
1073	W Fulton St. (West)	B	10.8	B	10.4	A	9.2	B	14.4	A	9.2	B	14.4	-1.6	+4.0	-1.6	+4.0
1074	W Fulton St. (East)	A	2.3	A	4.1	A	5.1	A	7.7	A	5.1	A	7.7	+2.8	+3.6	+2.8	+3.6
1077	W Lake St.	B	13.2	B	15.7	C	22.5	C	23.3	C	22.5	C	23.3	+9.3	+7.6	+9.3	+7.6
1079	W Washington Blvd.	A	9.7	A	8.9	A	7.8	B	10.4	A	7.8	B	10.4	-1.9	+1.5	-1.9	+1.5
1080	W Warren Blvd.	A	7.3	A	5.4	B	13.7	B	15.7	B	13.7	B	15.7	+6.4	+10.3	+6.4	+10.3
1082	W Madison St.	B	15.0	B	14.7	B	14.6	C	20.1	B	14.6	C	20.1	-0.4	+5.4	-0.4	+5.4
1083	W Ogden Ave.	C	23.9	C	24.5	C	20.8	B	15.7	C	23.0	B	16.9	-3.1	-8.8	-0.9	-7.6
1084	W Monroe St.	A	5.9	A	6.5	A	7.8	A	8.6	A	7.8	A	8.6	+1.9	+2.1	+1.9	+2.1
1085	W Adams St.	B	18.5	B	19.0	B	11.1	B	10.6	B	11.0	B	10.6	-7.4	-8.4	-7.5	-8.4
1086	W Jackson Blvd.	B	15.5	B	16.0	B	12.5	B	12.5	B	11.0	B	11.8	-3.0	-3.5	-4.5	-4.2
1088	W Van Buren St.	F	94.4	B	18.7	E	59.7	C	32.8	D	51.1	D	38.5	-34.7	+14.1	-43.3	+19.8
1089	W Congress Pkwy	B	15.2	B	14.4	D	36.0	D	37.4	D	36.0	D	39.9	+20.8	+23.0	+20.8	+25.5
1090	W Harrison St.	B	12.8	B	15.5	B	18.3	C	24.5	B	18.4	C	24.1	+5.5	+9.0	+5.6	+8.6
1091	W Flournoy St.	A	6.8	A	8.2	A	9.8	B	12.2	A	9.8	B	12.2	+3.0	+4.0	+3.0	+4.0
1092	W Polk St.	B	11.4	C	24.3	B	11.9	B	19.7	B	11.9	B	19.9	+0.5	-4.6	+0.5	-4.4
1093	W Taylor St.	B	12.3	B	14.3	B	13.6	B	19.8	B	13.6	B	19.6	+1.3	+5.5	+1.3	+5.3
1094	W Roosevelt Rd.	E	59.7	D	50.3	D	46.6	E	61.5	D	44.1	D	49.1	-13.1	+11.2	-15.6	-1.2
1096	W 13th St.	A	4.1	A	7.7	A	5.7	C	29.9	A	5.7	C	29.2	+1.6	+22.2	+1.6	+21.5

1098	W 14th St.	B	15.2	B	14.3	B	18.7	B	14.6	B	18.8	B	14.6	+3.5	+0.3	+3.6	+0.3
1103	W 18th St.	C	22.0	C	21.0	D	42.2	D	38.2	D	42.2	D	38.2	+20.2	+17.2	+20.2	+17.2
1105	W 19th St.	B	12.5	B	12.4	C	26.0	B	16.5	C	26.0	B	16.5	+13.5	+4.1	+13.5	+4.1
1107	W 21st St.	C	23.3	B	18.2	C	22.9	C	22.8	C	23.1	C	23.5	-0.4	+4.6	-0.2	+5.3
1109	W Cermak Rd.	E	68.1	D	51.5	F	145.6	F	115.4	F	127.1	F	96.3	+77.5	+63.9	+59.0	+44.8
1110	2451 S Ashland Ave.	A	2.2	A	1.8	A	2.6	A	2.2	A	2.6	A	2.3	+0.4	+0.4	+0.4	+0.5
1111	W 27th St.	A	1.7	A	2.1	A	1.9	A	0.9	A	1.9	A	0.9	+0.2	-1.2	+0.2	-1.2
1112	W Marketplace Access Rd.	A	5.2	A	3.1	A	9.8	A	8.0	A	9.8	A	8.0	+4.6	+4.9	+4.6	+4.9
1113	W 31st Pl.	B	19.3	B	19.0	D	37.4	C	29.5	D	37.4	C	29.5	+18.1	+10.5	+18.1	+10.5
1114	S Archer Ave.	C	26.6	C	24.7	C	28.2	C	29.4	C	28.2	C	29.4	+1.6	+4.7	+1.6	+4.7
1115	W Robinson St.	A	4.0	A	8.5	A	4.8	B	11.4	A	4.8	B	11.4	+0.8	+2.9	+0.8	+2.9
1118	W 33rd St.	A	6.1	B	18.9	B	10.6	B	11.1	B	10.6	B	11.1	+4.5	-7.8	+4.5	-7.8
1121	W 35th St.	C	22.9	B	18.2	C	20.7	C	25.5	C	20.7	C	25.5	-2.2	+7.3	-2.2	+7.3
1123	W 37th St.	A	5.8	A	4.0	B	10.4	A	6.6	B	10.4	A	6.6	+4.6	+2.6	+4.6	+2.6
1127	W Pershing Rd.	C	20.7	C	21.1	C	24.0	C	23.0	C	24.0	C	23.0	+3.3	+1.9	+3.3	+1.9
1130	W 42nd St. (West)	A	6.0	A	8.6	A	9.0	A	8.5	A	9.0	A	8.5	+3.0	-0.1	+3.0	-0.1
1131	W 42nd Pl.	A	6.5	A	2.8	A	7.3	A	4.3	A	7.3	A	4.3	+0.8	+1.5	+0.8	+1.5
1132	W 43rd St.	B	16.1	B	15.3	B	19.0	B	19.9	B	19.0	B	19.9	+2.9	+4.6	+2.9	+4.6
1133	W 44th St.	A	5.3	A	5.2	A	8.8	A	9.1	A	8.8	A	9.1	+3.5	+3.9	+3.5	+3.9
1134	W 45th St.	B	12.3	A	8.6	B	12.9	B	10.7	B	12.9	B	10.7	+0.6	+2.1	+0.6	+2.1
1135	W 46th St.	B	12.4	A	8.3	B	12.5	B	12.5	B	12.5	B	12.5	+0.1	+4.2	+0.1	+4.2
1136	W 47th St./ S. McDowell Ave.	C	22.2	B	19.0	C	20.6	B	18.8	C	20.6	B	18.8	-1.6	-0.2	-1.6	-0.2
1137	W 48th St.	A	6.7	A	8.0	B	14.2	D	38.6	B	14.2	D	38.6	+7.5	+30.6	+7.5	+30.6
1138	W 49th St.	A	7.0	A	7.8	B	12.6	A	9.4	B	12.6	A	9.4	+5.6	+1.6	+5.6	+1.6
1139	W 50th St.	A	8.2	A	7.5	B	10.8	B	11.4	B	10.8	B	11.4	+2.6	+3.9	+2.6	+3.9
1140	W 51st St.	B	19.5	C	20.0	B	18.4	B	17.2	B	18.4	B	17.2	-1.1	-2.8	-1.1	-2.8
1142	W 53rd St.	A	4.2	B	11.1	A	6.3	B	11.6	A	6.3	B	11.6	+2.1	+0.5	+2.1	+0.5
1144	W Garfield Blvd. (WB)	B	17.3	B	17.9	C	21.7	C	25.7	C	21.7	C	25.7	+4.4	+7.8	+4.4	+7.8
1145	W Garfield Blvd. (EB)	B	19.9	C	26.4	C	30.1	C	22.3	C	30.1	C	22.3	+10.2	-4.1	+10.2	-4.1
1148	W 57th St.	B	10.9	A	5.5	B	12.2	B	11.7	B	12.2	B	11.7	+1.3	+6.2	+1.3	+6.2
1150	W 59th St.	B	16.6	B	14.0	C	24.3	C	24.7	C	24.3	C	24.7	+7.7	+10.7	+7.7	+10.7
1152	W 61st St.	A	8.7	B	11.8	B	19.0	B	15.5	B	19.0	B	15.5	+10.3	+3.7	+10.3	+3.7
1154	W 63rd St.	C	31.2	C	27.3	B	18.2	C	21.3	B	18.2	C	21.3	-13.0	-6.0	-13.0	-6.0
1156	W 65th St.	A	3.1	A	1.9	A	8.5	A	5.8	A	8.5	A	5.8	+5.4	+3.9	+5.4	+3.9
1158	W Marquette Rd.	C	20.7	C	33.3	C	30.7	C	33.3	C	30.7	C	33.3	+10.0	+0.0	+10.0	+0.0
1160	W 69th St.	B	17.2	B	19.0	C	21.8	C	25.3	C	21.8	C	25.3	+4.6	+6.3	+4.6	+6.3
1162	W 71st St.	C	21.5	B	17.3	C	24.2	C	24.4	C	24.2	C	24.4	+2.7	+7.1	+2.7	+7.1
1168	W 74th St.	B	10.7	B	14.4	B	17.1	C	20.7	B	17.1	C	20.7	+6.4	+6.3	+6.4	+6.3
1170	W 76th St.	B	17.0	B	12.3	C	20.9	C	20.4	C	20.9	C	20.4	+3.9	+8.1	+3.9	+8.1
1173	W 79th St.	C	30.0	C	24.3	C	33.7	D	52.8	C	33.7	D	52.8	+3.7	+28.5	+3.7	+28.5
1175	W 81st St.	A	5.9	A	8.5	B	15.1	D	54.6	B	15.1	D	54.6	+9.2	+46.1	+9.2	+46.1
1177	W 83rd St.	B	14.7	C	22.4	B	19.6	C	28.6	B	19.6	C	28.6	+4.9	+6.2	+4.9	+6.2
1179	W 85th St.	B	10.1	A	5.6	B	12.8	B	10.8	B	12.8	B	10.8	+2.7	+5.2	+2.7	+5.2
1181	W 87th St.	D	44.9	C	33.5	D	38.1	D	50.5	D	38.1	D	50.5	-6.8	+17.0	-6.8	+17.0
1185	W 91st St.	A	8.0	A	5.1	B	13.8	B	11.7	B	13.8	B	11.7	+5.8	+6.6	+5.8	+6.6
1191	W 95th St.	D	38.3	C	34.4	D	43.8	C	28.8	D	43.8	C	28.8	+5.5	-5.6	+5.5	-5.6

Existing Level of Service Reports

HCM Signalized Intersection Capacity Analysis
1001: Ashland Ave. □ W Irving Park Rd.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	215	843	133	127	826	39	106	790	100	78	932	139
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	12	10	9	13	10	9
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.79	1.00	0.99		1.00	1.00	0.67	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1559	3040	1074	1544	3101		1674	2691	603	1732	3002	1000
Flt Permitted	0.13	1.00	1.00	0.14	1.00		0.12	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	210	3040	1074	232	3101		216	2691	603	343	3002	1000
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	236	926	146	140	908	43	116	868	110	86	1024	153
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	236	926	146	140	951	0	116	868	110	86	1024	153
Confl. Peds. (#/hr)	239		202	202		239	144		378	378		144
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	2%	5%	5%	3%	1%	3%	2%	2%	6%	1%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								36	36		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	37.2	31.2	31.2	36.8	31.0		38.1	32.7	32.7	35.9	31.6	31.6
Effective Green, g (s)	37.2	31.2	31.2	36.8	31.0		38.1	32.7	32.7	35.9	31.6	31.6
Actuated g/C Ratio	0.41	0.35	0.35	0.41	0.34		0.42	0.36	0.36	0.40	0.35	0.35
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2
Lane Grp Cap (vph)	176	1053	372	179	1068		178	977	219	203	1054	351
v/s Ratio Prot	c0.09	0.30		0.05	0.31		c0.04	0.32		0.02	c0.34	
v/s Ratio Perm	c0.46		0.14	0.27			0.24		0.18	0.15		0.15
v/c Ratio	1.34	0.88	0.39	0.78	0.89		0.65	0.89	0.50	0.42	0.97	0.44
Uniform Delay, d1	22.1	27.6	22.2	19.4	27.9		19.1	26.9	22.3	18.3	28.8	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.71	0.84	0.78	1.00	1.00	1.00
Incremental Delay, d2	186.5	10.5	3.1	18.3	11.2		4.5	8.7	5.7	0.5	21.7	3.9
Delay (s)	208.5	38.1	25.3	37.7	39.1		18.1	31.4	23.1	18.8	50.4	26.3
Level of Service	F	D	C	D	D		B	C	C	B	D	C
Approach Delay (s)		67.4			38.9			29.1			45.3	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	46.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1003: Ashland Ave. □ W Grace St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥					↰	↑↱		↰	↑↱	
Volume (vph)	56	74	46	0	0	0	25	994	50	32	1281	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	12	10	10	11	10	10
Total Lost time (s)		4.0					4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00					1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.98					1.00	1.00		1.00	1.00	
Frt		0.96					1.00	0.99		1.00	1.00	
Flt Protected		0.98					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1459					1710	2551		1517	2670	
Flt Permitted		0.98					0.12	1.00		0.19	1.00	
Satd. Flow (perm)		1459					216	2551		302	2670	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	62	81	51	0	0	0	27	1092	55	35	1408	15
RTOR Reduction (vph)	0	14	0	0	0	0	0	4	0	0	1	0
Lane Group Flow (vph)	0	180	0	0	0	0	27	1143	0	35	1422	0
Confl. Peds. (#/hr)	62		25	25		62	16		19	19		16
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	4%	0%	0%	0%	0%	0%	4%	2%	9%	2%	0%
Parking (#/hr)								44			38	
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		26.0					56.0	56.0		56.0	56.0	
Effective Green, g (s)		26.0					56.0	56.0		56.0	56.0	
Actuated g/C Ratio		0.29					0.62	0.62		0.62	0.62	
Clearance Time (s)		4.0					4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		421					134	1587		187	1661	
v/s Ratio Prot								0.45			c0.53	
v/s Ratio Perm		0.12					0.13			0.12		
v/c Ratio		0.43					0.20	0.72		0.19	0.86	
Uniform Delay, d1		26.0					7.3	11.6		7.3	13.7	
Progression Factor		1.00					2.18	2.18		0.31	0.61	
Incremental Delay, d2		3.1					2.7	2.3		1.3	3.6	
Delay (s)		29.1					18.8	27.8		3.5	11.9	
Level of Service		C					B	C		A	B	
Approach Delay (s)		29.1			0.0			27.6			11.7	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1005: Ashland Ave. □ W Addison St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	162	501	62	131	472	30	37	700	94	87	1182	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	12	10	10	12	10	10
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00	0.87
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1524	1500	1395	1433	1558	1249	1629	2569	795	1645	2696	876
Flt Permitted	0.33	1.00	1.00	0.30	1.00	1.00	0.11	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	522	1500	1395	451	1558	1249	185	2569	795	432	2696	876
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	178	551	68	144	519	33	41	769	103	96	1299	100
RTOR Reduction (vph)	0	0	6	0	0	9	0	0	31	0	0	18
Lane Group Flow (vph)	178	551	62	144	519	24	41	769	72	96	1299	82
Confl. Peds. (#/hr)	28		11	11		28	49		16	16		49
Confl. Bikes (#/hr)			2			1			1			2
Heavy Vehicles (%)	0%	8%	0%	11%	4%	10%	5%	5%	17%	3%	3%	5%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	44.0	44.0	44.0	44.0	44.0	44.0	37.0	37.0	37.0	37.0	37.0	37.0
Effective Green, g (s)	44.0	44.0	44.0	44.0	44.0	44.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	255	733	682	220	761	610	76	1056	326	177	1108	360
v/s Ratio Prot		c0.37			0.33			0.30			c0.48	
v/s Ratio Perm	0.34		0.04	0.32		0.02	0.22		0.09	0.22		0.09
v/c Ratio	0.70	0.75	0.09	0.65	0.68	0.04	0.54	0.73	0.22	0.54	1.17	0.23
Uniform Delay, d1	17.8	18.6	12.3	17.3	17.6	12.0	20.1	22.3	17.2	20.1	26.5	17.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.74	0.99
Incremental Delay, d2	14.7	7.0	0.3	14.2	4.9	0.1	24.8	4.4	1.6	6.3	83.1	0.8
Delay (s)	32.6	25.6	12.6	31.5	22.5	12.1	44.8	26.7	18.7	24.2	102.6	17.9
Level of Service	C	C	B	C	C	B	D	C	B	C	F	B
Approach Delay (s)		26.0			23.9			26.6			91.9	
Approach LOS		C			C			C			F	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1007: Ashland Ave. □ W Roscoe St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	89	185	64	15	928	0	0	1251	74
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	10	10	10	10	10
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					1.00		1.00	0.95			0.95	1.00
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.91
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.97		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1639		1653	2816			2597	821
Flt Permitted					0.99		0.13	1.00			1.00	1.00
Satd. Flow (perm)					1639		229	2816			2597	821
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	98	203	70	16	1020	0	0	1375	81
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	0	16
Lane Group Flow (vph)	0	0	0	0	361	0	16	1020	0	0	1375	65
Confl. Peds. (#/hr)	43		13	13		43	20		18	18		20
Confl. Bikes (#/hr)			2			1						4
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	6%	0%	0%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								6			48	48
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					24.0		53.0	53.0			53.0	53.0
Effective Green, g (s)					24.0		53.0	53.0			53.0	53.0
Actuated g/C Ratio					0.28		0.62	0.62			0.62	0.62
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					462		142	1755			1619	511
v/s Ratio Prot								0.36			c0.53	
v/s Ratio Perm					0.22		0.07					0.08
v/c Ratio					0.78		0.11	0.58			0.85	0.13
Uniform Delay, d1					28.1		6.5	9.4			12.8	6.5
Progression Factor					1.00		2.06	2.26			1.00	1.00
Incremental Delay, d2					12.4		1.2	1.1			5.8	0.5
Delay (s)					40.4		14.5	22.4			18.6	7.1
Level of Service					D		B	C			B	A
Approach Delay (s)		0.0			40.4			22.3			17.9	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1009: Ashland Ave. □ W School St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↑	↱
Volume (vph)	122	228	19	14	8	10	8	912	17	61	1148	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	10	9
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	0.86
Flpb, ped/bikes		0.99			0.99		1.00	1.00		0.99	1.00	1.00
Frt		0.99			0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1608			1545		1653	2804		1635	2944	1007
Flt Permitted		0.88			0.85		0.14	1.00		0.22	1.00	1.00
Satd. Flow (perm)		1437			1335		250	2804		371	2944	1007
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	134	251	21	15	9	11	9	1002	19	67	1262	32
RTOR Reduction (vph)	0	2	0	0	7	0	0	2	0	0	0	10
Lane Group Flow (vph)	0	404	0	0	28	0	9	1019	0	67	1262	22
Confl. Peds. (#/hr)	24		35	35		24	33		24	24		33
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	2%	0%	5%	0%	0%	0%	0%	5%	6%	0%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		28.0			28.0		49.0	49.0		49.0	49.0	49.0
Effective Green, g (s)		28.0			28.0		49.0	49.0		49.0	49.0	49.0
Actuated g/C Ratio		0.33			0.33		0.58	0.58		0.58	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		473			439		144	1616		213	1697	580
v/s Ratio Prot								0.36			c0.43	
v/s Ratio Perm		c0.28			0.02		0.04			0.18		0.02
v/c Ratio		0.85			0.06		0.06	0.63		0.31	0.74	0.04
Uniform Delay, d1		26.6			19.5		7.9	12.0		9.3	13.3	7.8
Progression Factor		1.00			1.00		1.00	1.00		1.07	1.31	1.02
Incremental Delay, d2		17.6			0.3		0.8	1.9		1.9	1.5	0.1
Delay (s)		44.2			19.8		8.7	13.9		11.9	19.0	8.0
Level of Service		D			B		A	B		B	B	A
Approach Delay (s)		44.2			19.8			13.8			18.4	
Approach LOS		D			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

Movement	EBL2	EBL	EBT	EBR	EBR2	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations			↱			↑	↱			↰	↑↑	↱
Volume (vph)	3	1	382	105	40	245	135	43	2	65	891	93
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	10	12	11	11	10	10
Total Lost time (s)			5.0			5.0	5.0			6.0	6.0	6.0
Lane Util. Factor			1.00			1.00	1.00			1.00	0.95	1.00
Frpb, ped/bikes			0.97			1.00	0.90			1.00	1.00	0.87
Flpb, ped/bikes			1.00			1.00	1.00			1.00	1.00	1.00
Frt			0.96			1.00	0.85			1.00	1.00	0.85
Flt Protected			1.00			1.00	1.00			0.95	1.00	1.00
Satd. Flow (prot)			1506			1706	1162			1493	2706	894
Flt Permitted			1.00			1.00	1.00			0.13	1.00	1.00
Satd. Flow (perm)			1503			1706	1162			203	2706	894
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	3	1	420	115	44	269	148	47	2	71	979	102
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	583	0	0	269	195	0	0	73	979	103
Confl. Peds. (#/hr)		42		51			42			26		47
Confl. Bikes (#/hr)				8								
Heavy Vehicles (%)	0%	0%	8%	7%	5%	2%	13%	5%	0%	11%	5%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)											24	24
Turn Type	Perm	Perm	NA			NA	Perm		Perm	Perm	NA	Perm
Protected Phases			10			14					2	
Permitted Phases	10	10					14		2	2		2
Actuated Green, G (s)			27.0			27.0	27.0			31.0	31.0	31.0
Effective Green, g (s)			27.0			27.0	27.0			31.0	31.0	31.0
Actuated g/C Ratio			0.27			0.27	0.27			0.31	0.31	0.31
Clearance Time (s)			5.0			5.0	5.0			6.0	6.0	6.0
Lane Grp Cap (vph)			405			460	313			62	838	277
v/s Ratio Prot						0.16					0.36	
v/s Ratio Perm			c0.39				0.17			0.36		0.12
v/c Ratio			1.44			0.58	0.62			1.18	1.17	0.37
Uniform Delay, d1			36.5			31.6	32.0			34.5	34.5	26.9
Progression Factor			1.00			1.00	1.00			1.00	1.00	1.00
Incremental Delay, d2			211.4			5.4	9.0			170.2	88.5	3.8
Delay (s)			247.9			37.0	41.1			204.7	123.0	30.7
Level of Service			F			D	D			F	F	C
Approach Delay (s)			247.9			38.7					119.9	
Approach LOS			F			D					F	

Intersection Summary			
HCM 2000 Control Delay	128.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	136.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

Movement	NBR2	SBL2	SBL	SBT	SBR	SEL	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations			↰	↑↱		↰	↱				↰	↱
Volume (vph)	1	16	76	985	9	26	335	109	1	7	16	247
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	12	12	11	11	9	11	11	11	12	9	11
Total Lost time (s)			6.0	6.0		6.0	6.0				6.0	6.0
Lane Util. Factor			1.00	0.95		1.00	1.00				1.00	1.00
Frpb, ped/bikes			1.00	1.00		1.00	1.00				1.00	1.00
Flpb, ped/bikes			1.00	1.00		1.00	1.00				1.00	1.00
Frt			1.00	1.00		1.00	0.96				1.00	0.97
Flt Protected			0.95	1.00		0.95	1.00				0.95	1.00
Satd. Flow (prot)			1710	3071		1374	1623				1539	1662
Flt Permitted			0.13	1.00		0.30	1.00				0.16	1.00
Satd. Flow (perm)			232	3071		428	1623				259	1662
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	18	84	1082	10	29	368	120	1	8	18	271
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	102	1092	0	29	489	0	0	0	26	343
Confl. Peds. (#/hr)			47		26							
Confl. Bikes (#/hr)												
Heavy Vehicles (%)	100%	0%	0%	2%	11%	12%	3%	4%	0%	0%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)				0								
Turn Type		Perm	Perm	NA		Perm	NA			Perm	Perm	NA
Protected Phases				6			4					8
Permitted Phases		6	6			4				8	8	
Actuated Green, G (s)			31.0	31.0		25.0	25.0				25.0	25.0
Effective Green, g (s)			31.0	31.0		25.0	25.0				25.0	25.0
Actuated g/C Ratio			0.31	0.31		0.25	0.25				0.25	0.25
Clearance Time (s)			6.0	6.0		6.0	6.0				6.0	6.0
Lane Grp Cap (vph)			71	952		107	405				64	415
v/s Ratio Prot				0.36			c0.30					0.21
v/s Ratio Perm			c0.44			0.07					0.10	
v/c Ratio			1.44	1.15		0.27	1.21				0.41	0.83
Uniform Delay, d1			34.5	34.5		30.2	37.5				31.3	35.4
Progression Factor			1.00	1.00		1.00	1.00				1.00	1.00
Incremental Delay, d2			259.6	78.6		6.1	114.4				18.0	17.0
Delay (s)			294.1	113.1		36.3	151.9				49.3	52.4
Level of Service			F	F		D	F				D	D
Approach Delay (s)				128.6			145.5					52.2
Approach LOS				F			F					D

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	63	3
Ideal Flow (vphpl)	1800	1800
Lane Width	11	11
Total Lost time (s)		
Lane Util. Factor		
Frpb, ped/bikes		
Flpb, ped/bikes		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	69	3
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	0
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	3%	0%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	143	126	5	55	982	0	0	1094	74
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	10	11	11	10
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					1.00		1.00	0.95			0.95	1.00
Frpb, ped/bikes					1.00		1.00	1.00			1.00	0.81
Flpb, ped/bikes					0.99		1.00	1.00			1.00	1.00
Frt					1.00		1.00	1.00			1.00	0.85
Flt Protected					0.97		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1930		1653	2812			2808	818
Flt Permitted					0.97		0.17	1.00			1.00	1.00
Satd. Flow (perm)					1930		299	2812			2808	818
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	157	138	5	60	1079	0	0	1202	81
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	25
Lane Group Flow (vph)	0	0	0	0	299	0	60	1079	0	0	1202	56
Confl. Peds. (#/hr)	54		19	19		54	48		130	130		48
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	0%	7%	0%	0%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								16			30	30
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					25.0		52.0	52.0			52.0	52.0
Effective Green, g (s)					25.0		52.0	52.0			52.0	52.0
Actuated g/C Ratio					0.29		0.61	0.61			0.61	0.61
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					567		182	1720			1717	500
v/s Ratio Prot								0.38			c0.43	
v/s Ratio Perm					0.16		0.20					0.07
v/c Ratio					0.53		0.33	0.63			0.70	0.11
Uniform Delay, d1					25.1		8.0	10.4			11.2	6.9
Progression Factor					1.00		1.12	1.33			1.00	1.00
Incremental Delay, d2					3.5		4.3	1.6			2.4	0.5
Delay (s)					28.6		13.3	15.4			13.6	7.3
Level of Service					C		B	B			B	A
Approach Delay (s)		0.0			28.6			15.3			13.2	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. □ W Wellington Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥					↰	↑↑	↱	↰	↑↱	
Volume (vph)	51	125	112	0	0	0	38	800	54	19	1056	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	10	9	11	10	9
Total Lost time (s)		4.0					4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00					1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99					1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00					1.00	1.00	1.00	1.00	1.00	
Frt		0.95					1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1658					1605	2571	1067	1652	2842	
Flt Permitted		0.99					0.18	1.00	1.00	0.28	1.00	
Satd. Flow (perm)		1658					299	2571	1067	482	2842	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	56	137	123	0	0	0	42	879	59	21	1160	22
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	21	0	2	0
Lane Group Flow (vph)	0	289	0	0	0	0	42	879	38	21	1180	0
Confl. Peds. (#/hr)	8		1	1		8	2		1	1		2
Heavy Vehicles (%)	2%	2%	0%	0%	0%	0%	3%	13%	0%	0%	4%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA					Perm	NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4						2		2	6		
Actuated Green, G (s)		25.0					52.0	52.0	52.0	52.0	52.0	
Effective Green, g (s)		25.0					52.0	52.0	52.0	52.0	52.0	
Actuated g/C Ratio		0.29					0.61	0.61	0.61	0.61	0.61	
Clearance Time (s)		4.0					4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		487					182	1572	652	294	1738	
v/s Ratio Prot								0.34			c0.42	
v/s Ratio Perm		0.17					0.14		0.04	0.04		
v/c Ratio		0.59					0.23	0.56	0.06	0.07	0.68	
Uniform Delay, d1		25.7					7.5	9.7	6.6	6.7	11.0	
Progression Factor		1.00					1.69	1.91	2.50	1.84	1.82	
Incremental Delay, d2		5.3					2.1	1.0	0.1	0.3	1.6	
Delay (s)		30.9					14.7	19.6	16.8	12.6	21.6	
Level of Service		C					B	B	B	B	C	
Approach Delay (s)		30.9			0.0			19.3			21.4	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1018: Ashland Ave. □ W Diversey Pkwy.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↱	
Volume (vph)	184	683	75	132	449	64	12	968	116	80	1838	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	12	12	12	11	11	11
Total Lost time (s)	3.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.94	1.00	1.00	0.93	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1532	1615	1271	1554	1647	1252	1710	3196	1276	1574	3203	
Flt Permitted	0.18	1.00	1.00	0.14	1.00	1.00	0.10	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	289	1615	1271	226	1647	1252	176	3196	1276	241	3203	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	202	751	82	145	493	70	13	1064	127	88	2020	112
RTOR Reduction (vph)	0	0	7	0	0	34	0	0	26	0	5	0
Lane Group Flow (vph)	202	751	75	145	493	36	13	1064	101	88	2127	0
Confl. Peds. (#/hr)	44		31	31		44	76		20	20		76
Confl. Bikes (#/hr)			5			2			3			1
Heavy Vehicles (%)	4%	4%	3%	2%	2%	3%	0%	7%	11%	5%	1%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	38.0	38.0	38.0	29.0	29.0	29.0	41.0	41.0	41.0	39.0	39.0	
Effective Green, g (s)	38.0	38.0	38.0	29.0	29.0	29.0	41.0	41.0	41.0	39.0	39.0	
Actuated g/C Ratio	0.45	0.45	0.45	0.34	0.34	0.34	0.48	0.48	0.48	0.46	0.46	
Clearance Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	4.0	4.0	
Lane Grp Cap (vph)	216	722	568	77	561	427	84	1541	615	110	1469	
v/s Ratio Prot	0.07	c0.46			0.30			0.33			c0.66	
v/s Ratio Perm	0.35		0.06	c0.64		0.03	0.07		0.08	0.36		
v/c Ratio	0.94	1.04	0.13	1.88	0.88	0.09	0.15	0.69	0.16	0.80	1.45	
Uniform Delay, d1	20.6	23.5	13.8	28.0	26.3	19.0	12.3	17.1	12.4	19.7	23.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.90	1.89	2.38	0.75	0.82	
Incremental Delay, d2	46.4	44.4	0.5	442.2	17.6	0.4	3.1	2.0	0.5	42.0	205.3	
Delay (s)	67.1	67.9	14.3	470.2	43.9	19.4	26.5	34.2	29.9	56.8	224.1	
Level of Service	E	E	B	F	D	B	C	C	C	E	F	
Approach Delay (s)		63.5			128.8			33.7			217.5	
Approach LOS		E			F			C			F	

Intersection Summary			
HCM 2000 Control Delay	131.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	119.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↰		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	31	188	97	102	107	14	31	1016	80	30	1284	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	9	9	9	9	12	11	10	10	11	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	2.0	2.0	2.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00			1.00		1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.96			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1533			1560		1605	3011	911	1653	3129	1359
Flt Permitted		0.95			0.59		0.11	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)		1466			940		185	3011	911	334	3129	1359
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	34	207	107	112	118	15	34	1116	88	33	1411	45
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	348	0	0	242	0	34	1116	88	33	1411	38
Confl. Peds. (#/hr)	12		2	2		12	3		4	4		3
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	1%	1%	0%	0%	3%	6%	4%	0%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)									38			
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		27.0			27.0		50.0	50.0	50.0	52.0	52.0	52.0
Effective Green, g (s)		27.0			27.0		50.0	50.0	50.0	52.0	52.0	52.0
Actuated g/C Ratio		0.32			0.32		0.59	0.59	0.59	0.61	0.61	0.61
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	2.0	2.0	2.0
Lane Grp Cap (vph)		465			298		108	1771	535	204	1914	831
v/s Ratio Prot								0.37			c0.45	
v/s Ratio Perm		0.24			c0.26		0.18		0.10	0.10		0.03
v/c Ratio		0.75			0.81		0.31	0.63	0.16	0.16	0.74	0.05
Uniform Delay, d1		26.0			26.7		8.8	11.5	8.0	7.1	11.7	6.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	0.33	0.30	0.19
Incremental Delay, d2		10.5			21.0		7.5	1.7	0.7	0.2	0.2	0.0
Delay (s)		36.5			47.7		16.3	13.2	8.6	2.5	3.7	1.3
Level of Service		D			D		B	B	A	A	A	A
Approach Delay (s)		36.5			47.7			12.9			3.6	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1023: Ashland Ave. □ W Fullerton Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑↑	↱	↰	↑↑	↱
Volume (vph)	123	594	7	165	445	14	0	873	81	30	1229	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	10	10	10	10	10	10
Total Lost time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0	2.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.92	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1476	3035		1491	1631	1323		2804	1055	1492	2973	1079
Flt Permitted	0.18	1.00		0.25	1.00	1.00		1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	273	3035		397	1631	1323		2804	1055	279	2973	1079
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	135	653	8	181	489	15	0	959	89	33	1351	131
RTOR Reduction (vph)	0	1	0	0	0	10	0	0	44	0	0	44
Lane Group Flow (vph)	135	660	0	181	489	5	0	959	45	33	1351	87
Confl. Peds. (#/hr)	20		24	24		20	38		39	39		38
Confl. Bikes (#/hr)			5			1			2			3
Heavy Vehicles (%)	8%	5%	0%	3%	3%	0%	0%	7%	6%	7%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	custom	pm+pt	NA	Perm
Protected Phases	7	4		3	8			2 10		1	6	
Permitted Phases	4			8		8			2	6		6
Actuated Green, G (s)	49.0	43.0		49.0	43.0	43.0		61.8	55.2	59.4	55.2	55.2
Effective Green, g (s)	49.0	43.0		49.0	43.0	43.0		59.8	55.2	59.4	55.2	55.2
Actuated g/C Ratio	0.38	0.33		0.38	0.33	0.33		0.46	0.42	0.46	0.42	0.42
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0			5.0	2.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	158	1003		200	539	437		1289	447	166	1262	458
v/s Ratio Prot	0.04	0.22		c0.04	c0.30			c0.34		c0.01	c0.45	
v/s Ratio Perm	0.28			0.30		0.00			0.04	0.08		0.08
v/c Ratio	0.85	0.66		0.91	0.91	0.01		0.74	0.10	0.20	1.07	0.19
Uniform Delay, d1	37.0	37.2		38.0	41.6	29.2		28.8	22.5	21.7	37.4	23.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.97	1.75	1.00	1.00	1.00
Incremental Delay, d2	33.6	3.4		38.1	21.5	0.0		0.4	0.0	0.6	46.5	0.9
Delay (s)	70.6	40.6		76.0	63.1	29.3		28.2	39.3	22.3	83.9	24.3
Level of Service	E	D		E	E	C		C	D	C	F	C
Approach Delay (s)		45.7			65.8			29.2			77.4	
Approach LOS		D			E			C			E	

Intersection Summary			
HCM 2000 Control Delay	56.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1024: Medill Ave. □ Ashland Ave. □ N Clybourn Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations		↑	↱		↰↑↑↱		↰	↑↑↱		↰	↑↑↱	
Volume (vph)	3	528	176	18	190	42	44	972	56	157	1302	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	11	11	11	11	11	11	11	10	10	10
Total Lost time (s)		5.0	5.0		5.0		3.0	5.0		3.0	5.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1740	1442		3052		1517	2855		1580	2923	
Flt Permitted		1.00	1.00		0.86		0.08	1.00		0.08	1.00	
Satd. Flow (perm)		1738	1442		2640		130	2855		129	2923	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	3	580	193	20	209	46	48	1068	62	173	1431	2
RTOR Reduction (vph)	0	0	0	0	11	0	0	3	0	0	51	0
Lane Group Flow (vph)	0	583	193	0	264	0	48	1127	0	173	1382	0
Confl. Peds. (#/hr)	2		14			2	35		4	4		
Heavy Vehicles (%)	0%	0%	0%	0%	5%	7%	9%	9%	7%	1%	2%	50%
Parking (#/hr)								0			6	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		59.0	59.0		59.0		55.4	49.0		60.6	51.6	
Effective Green, g (s)		59.0	59.0		59.0		55.4	49.0		60.6	51.6	
Actuated g/C Ratio		0.45	0.45		0.45		0.43	0.38		0.47	0.40	
Clearance Time (s)		5.0	5.0		5.0		3.0	5.0		3.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		788	654		1198		123	1076		160	1160	
v/s Ratio Prot							0.02	0.39		c0.07	c0.47	
v/s Ratio Perm		c0.34	0.13		0.10		0.15			0.43		
v/c Ratio		0.74	0.30		0.22		0.39	1.05		1.08	1.19	
Uniform Delay, d1		29.2	22.4		21.5		30.1	40.5		34.6	39.2	
Progression Factor		1.00	1.00		1.00		1.04	0.89		1.66	0.40	
Incremental Delay, d2		6.2	1.1		0.4		1.7	38.6		59.6	88.6	
Delay (s)		35.4	23.5		22.0		32.9	74.8		116.9	104.4	
Level of Service		D	C		C		C	E		F	F	
Approach Delay (s)		32.4			22.0			73.1			105.7	
Approach LOS		C			C			E			F	

Intersection Summary			
HCM 2000 Control Delay	74.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	118.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1024: Medill Ave. □ Ashland Ave. □ N Clybourn Ave.

Movement	NEL
Lane Configurations	
Volume (vph)	0
Ideal Flow (vphpl)	1800
Lane Width	16
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	2%
Parking (#/hr)	
Turn Type	
Protected Phases	10
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	0.0
Approach LOS	A

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↱		↰	↑↑	↱	↰	↑↱	
Volume (vph)	48	223	3	152	223	12	9	820	122	10	1200	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	9	10	10
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00		0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1659	1406		3112		1596	2660	1191	1398	2879	
Flt Permitted		0.87	1.00		0.67		0.12	1.00	1.00	0.24	1.00	
Satd. Flow (perm)		1460	1406		2134		204	2660	1191	360	2879	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	53	245	3	167	245	13	10	901	134	11	1319	138
RTOR Reduction (vph)	0	0	2	0	3	0	0	0	66	0	12	0
Lane Group Flow (vph)	0	298	1	0	422	0	10	901	68	11	1445	0
Confl. Peds. (#/hr)	4		4	4		4	7		2	2		7
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	14%	2%	10%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		24.0	24.0		24.0		33.0	33.0	33.0	33.0	33.0	
Effective Green, g (s)		24.0	24.0		24.0		33.0	33.0	33.0	33.0	33.0	
Actuated g/C Ratio		0.37	0.37		0.37		0.51	0.51	0.51	0.51	0.51	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		539	519		787		103	1350	604	182	1461	
v/s Ratio Prot								0.34			c0.50	
v/s Ratio Perm		c0.20	0.00		0.20		0.05		0.06	0.03		
v/c Ratio		0.55	0.00		0.54		0.10	0.67	0.11	0.06	0.99	
Uniform Delay, d1		16.2	12.9		16.1		8.3	11.9	8.4	8.1	15.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.23	1.44	
Incremental Delay, d2		4.0	0.0		2.6		1.9	2.6	0.4	0.1	4.9	
Delay (s)		20.3	12.9		18.7		10.2	14.5	8.7	10.1	27.7	
Level of Service		C	B		B		B	B	A	B	C	
Approach Delay (s)		20.2			18.7			13.8			27.5	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1026: Ashland Ave. □ N Elston Ave.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↑	↱	↰	↑↑		↰	↑↱	
Volume (vph)	1	492	59	4	104	71	49	990	0	151	1325	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	10	14	14	10	10	10
Total Lost time (s)	4.0	4.0	4.0		4.0	3.0	4.0	4.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1647	1320		1925	1461	1535	3332		1520	3001	
Flt Permitted	0.65	1.00	1.00		0.77	1.00	0.12	1.00		0.12	1.00	
Satd. Flow (perm)	1091	1647	1320		1485	1461	196	3332		194	3001	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	541	65	4	114	78	54	1088	0	166	1456	4
RTOR Reduction (vph)	0	0	46	0	0	37	0	0	0	0	0	0
Lane Group Flow (vph)	1	541	19	0	118	41	54	1088	0	166	1460	0
Confl. Peds. (#/hr)	9		10	10		9						
Heavy Vehicles (%)	0%	2%	2%	0%	6%	3%	4%	4%	0%	5%	1%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	31.0	31.0	31.0		31.0	41.0	53.0	53.0		43.0	43.0	
Effective Green, g (s)	31.0	31.0	31.0		31.0	41.0	53.0	53.0		43.0	43.0	
Actuated g/C Ratio	0.30	0.30	0.30		0.30	0.39	0.50	0.50		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0		4.0	3.0	4.0	4.0		3.0	3.0	
Lane Grp Cap (vph)	322	486	389		438	570	353	1681		205	1228	
v/s Ratio Prot		c0.33				0.01	0.03	c0.33		0.08	c0.49	
v/s Ratio Perm	0.00		0.01		0.08	0.02	0.05			0.25		
v/c Ratio	0.00	1.11	0.05		0.27	0.07	0.15	0.65		0.81	1.19	
Uniform Delay, d1	26.1	37.0	26.5		28.3	20.1	32.3	19.1		24.0	31.0	
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.69	0.63		1.00	1.00	
Incremental Delay, d2	0.0	75.5	0.2		1.5	0.2	0.5	1.0		28.1	93.4	
Delay (s)	26.1	112.5	26.7		29.8	20.3	22.9	13.1		52.1	124.4	
Level of Service	C	F	C		C	C	C	B		D	F	
Approach Delay (s)		103.2			26.0			13.6			117.0	
Approach LOS		F			C			B			F	

Intersection Summary			
HCM 2000 Control Delay	76.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1027: Ashland Ave. □ W Armitage Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰			↰↑↱			↑↑	↱
Volume (vph)	462	409	57	3	182	0	30	612	0	0	971	353
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	10	10	10	11	11	10
Total Lost time (s)	3.0	5.0			5.0			4.0			4.0	3.0
Lane Util. Factor	1.00	1.00			1.00			0.91			0.95	1.00
Frpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	0.97
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	1.00
Frt	1.00	0.98			1.00			1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00			1.00			1.00	1.00
Satd. Flow (prot)	1541	1557			1943			3844			3210	1226
Flt Permitted	0.36	1.00			0.99			0.85			1.00	1.00
Satd. Flow (perm)	578	1557			1929			3280			3210	1226
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	508	449	63	3	200	0	33	673	0	0	1067	388
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	508	507	0	0	203	0	0	706	0	0	1067	388
Confl. Peds. (#/hr)	11		2	2		11	7		3	3		7
Heavy Vehicles (%)	7%	6%	4%	0%	5%	0%	10%	14%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	0	0
Parking (#/hr)								0				0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA			NA	custom
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2					1 6
Actuated Green, G (s)	42.0	42.0			20.0			41.0			54.0	54.0
Effective Green, g (s)	42.0	42.0			20.0			41.0			54.0	54.0
Actuated g/C Ratio	0.40	0.40			0.19			0.39			0.51	0.51
Clearance Time (s)	3.0	5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)	405	622			367			1280			1650	630
v/s Ratio Prot	c0.23	0.33									c0.33	
v/s Ratio Perm	c0.27				0.11			0.22				0.32
v/c Ratio	1.25	0.82			0.55			0.55			0.65	0.62
Uniform Delay, d1	28.6	28.0			38.5			24.9			18.6	18.1
Progression Factor	1.00	1.00			1.00			0.84			0.46	0.44
Incremental Delay, d2	133.3	11.3			5.9			1.5			0.2	0.4
Delay (s)	161.9	39.3			44.4			22.4			8.7	8.3
Level of Service	F	D			D			C			A	A
Approach Delay (s)		100.4			44.4			22.4			8.6	
Approach LOS		F			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1029: Ashland Ave. □ W Cortland St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↑↱			↑↱	
Volume (vph)	1	275	20	98	121	4	0	697	86	0	1021	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frpb, ped/bikes		1.00	0.94		1.00			0.98			1.00	
Flpb, ped/bikes		1.00	1.00		0.99			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.99	
Flt Protected		1.00	1.00		0.98			1.00			1.00	
Satd. Flow (prot)		1666	1364		1586			2346			3019	
Flt Permitted		1.00	1.00		0.65			1.00			1.00	
Satd. Flow (perm)		1666	1364		1048			2346			3019	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	302	22	108	133	4	0	766	95	0	1122	53
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	303	22	0	244	0	0	861	0	0	1175	0
Confl. Peds. (#/hr)	159		27	27		159	28		52	52		28
Heavy Vehicles (%)	0%	8%	5%	6%	12%	0%	0%	8%	3%	0%	3%	0%
Parking (#/hr)								64			0	
Turn Type	Perm	NA	Perm	pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		43.0	43.0		43.0			53.0			53.0	
Effective Green, g (s)		43.0	43.0		43.0			53.0			53.0	
Actuated g/C Ratio		0.41	0.41		0.41			0.50			0.50	
Clearance Time (s)		5.0	5.0		5.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		682	558		429			1184			1523	
v/s Ratio Prot								0.37			c0.39	
v/s Ratio Perm		0.18	0.02		c0.23							
v/c Ratio		0.44	0.04		0.57			0.73			0.77	
Uniform Delay, d1		22.4	18.6		23.9			20.3			21.1	
Progression Factor		1.00	1.00		1.00			1.00			0.37	
Incremental Delay, d2		2.1	0.1		1.7			3.9			3.3	
Delay (s)		24.5	18.7		25.6			24.3			11.1	
Level of Service		C	B		C			C			B	
Approach Delay (s)		24.1			25.6			24.3			11.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1030: Ashland Ave. □ W Wabansia Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	34	5	130	25	10	18	24	624	9	9	915	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	9	10	10	9
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.96			1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00			0.99		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1419			1119		1477	2568	994	1589	2944	1037
Flt Permitted		0.93			0.72		0.26	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)		1328			830		412	2568	994	642	2944	1037
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	37	5	143	27	11	20	26	686	10	10	1005	16
RTOR Reduction (vph)	0	96	0	0	17	0	0	0	2	0	0	3
Lane Group Flow (vph)	0	89	0	0	41	0	26	686	8	10	1005	13
Confl. Peds. (#/hr)	1		20	20		1	1		4	4		1
Heavy Vehicles (%)	0%	0%	1%	40%	0%	56%	8%	10%	0%	0%	3%	13%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		12.6			12.6		64.4	64.4	64.4	64.4	64.4	64.4
Effective Green, g (s)		12.6			12.6		64.4	64.4	64.4	64.4	64.4	64.4
Actuated g/C Ratio		0.15			0.15		0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		5.0			5.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		196			123		312	1945	753	486	2230	785
v/s Ratio Prot								0.27			c0.34	
v/s Ratio Perm		c0.07			0.05		0.06		0.01	0.02		0.01
v/c Ratio		0.45			0.33		0.08	0.35	0.01	0.02	0.45	0.02
Uniform Delay, d1		33.1			32.4		2.7	3.4	2.5	2.5	3.8	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.4			3.3		0.5	0.5	0.0	0.1	0.7	0.0
Delay (s)		36.5			35.8		3.2	3.9	2.5	2.6	4.5	2.6
Level of Service		D			D		A	A	A	A	A	A
Approach Delay (s)		36.5			35.8			3.9			4.4	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1033: Ashland Ave. □ W North Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	64	537	33	90	386	19	62	706	91	190	1013	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	10	10	10	10	10	10
Total Lost time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1293	2661		1507	2999		1506	2415	895	1595	2619	849
Flt Permitted	0.41	1.00		0.28	1.00		0.11	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	554	2661		438	2999		179	2415	895	384	2619	849
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	70	590	36	99	424	21	68	776	100	209	1113	34
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	52	0	0	20
Lane Group Flow (vph)	70	621	0	99	441	0	68	776	48	209	1113	14
Confl. Peds. (#/hr)			13	13			27		10	10		27
Heavy Vehicles (%)	19%	15%	6%	2%	2%	0%	6%	15%	11%	0%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	34.6	29.0		34.6	29.0		40.2	35.4	35.4	42.6	36.6	36.6
Effective Green, g (s)	34.6	29.0		34.6	29.0		40.2	35.4	35.4	42.6	36.6	36.6
Actuated g/C Ratio	0.38	0.32		0.38	0.32		0.45	0.39	0.39	0.47	0.41	0.41
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	258	857		234	966		150	949	352	262	1065	345
v/s Ratio Prot	0.02	c0.23		c0.03	0.15		0.02	0.32		c0.05	c0.43	
v/s Ratio Perm	0.09			0.14			0.18		0.05	0.32		0.02
v/c Ratio	0.27	0.72		0.42	0.46		0.45	0.82	0.14	0.80	1.05	0.04
Uniform Delay, d1	18.2	27.0		18.9	24.2		17.2	24.4	17.5	17.7	26.7	16.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	5.3		1.2	1.6		2.2	7.8	0.8	15.4	40.1	0.2
Delay (s)	18.8	32.3		20.1	25.8		19.4	32.2	18.3	33.1	66.8	16.3
Level of Service	B	C		C	C		B	C	B	C	E	B
Approach Delay (s)		30.9			24.8			29.8			60.3	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1039: Ashland Ave. □ W Blackhawk St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	11	71	11	49	25	44	9	792	45	63	1077	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	9	10	10	9	10	10
Total Lost time (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.95		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1946			1581		1533	2520		1503	2783	
Flt Permitted		0.97			0.87		0.14	1.00		0.24	1.00	
Satd. Flow (perm)		1907			1409		232	2520		379	2783	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	12	78	12	54	27	48	10	870	49	69	1184	24
RTOR Reduction (vph)	0	8	0	0	30	0	0	6	0	0	2	0
Lane Group Flow (vph)	0	94	0	0	99	0	10	913	0	69	1206	0
Confl. Peds. (#/hr)	24		9	9		24	19		9	9		19
Heavy Vehicles (%)	9%	0%	9%	0%	0%	2%	0%	5%	0%	2%	5%	9%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			24.0		35.0	35.0		35.0	35.0	
Effective Green, g (s)		24.0			24.0		35.0	35.0		35.0	35.0	
Actuated g/C Ratio		0.37			0.37		0.54	0.54		0.54	0.54	
Clearance Time (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		704			520		124	1356		204	1498	
v/s Ratio Prot								0.36			c0.43	
v/s Ratio Perm		0.05			c0.07		0.04			0.18		
v/c Ratio		0.13			0.19		0.08	0.67		0.34	0.80	
Uniform Delay, d1		13.6			13.9		7.2	10.9		8.5	12.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.8		1.3	2.7		4.4	4.7	
Delay (s)		14.0			14.7		8.5	13.5		12.9	16.9	
Level of Service		B			B		A	B		B	B	
Approach Delay (s)		14.0			14.7			13.5			16.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1042: Ashland Ave. □ N Milwaukee Ave.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↱			↑	↱	↰	↑↑	↱	↰	↑↱	
Volume (vph)	8	372	83	0	175	51	65	722	21	66	1051	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	10	10	8	10	11	11
Total Lost time (s)	5.0	5.0			5.0	3.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.97	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1556	1602			1642	1285	1478	2956	1123	1516	3049	
Flt Permitted	0.64	1.00			1.00	1.00	0.11	1.00	1.00	0.35	1.00	
Satd. Flow (perm)	1043	1602			1642	1285	164	2956	1123	561	3049	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	9	409	91	0	192	56	71	793	23	73	1155	0
RTOR Reduction (vph)	0	9	0	0	0	35	0	0	11	0	0	0
Lane Group Flow (vph)	9	491	0	0	192	21	71	793	12	73	1155	0
Confl. Peds. (#/hr)	40		24	24		40	11		4	4		11
Heavy Vehicles (%)	0%	5%	5%	0%	6%	10%	8%	8%	0%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4					3 8	2		2	6		
Actuated Green, G (s)	29.0	29.0			33.0	33.0	47.0	47.0	47.0	39.0	39.0	
Effective Green, g (s)	29.0	29.0			33.0	33.0	47.0	47.0	47.0	39.0	39.0	
Actuated g/C Ratio	0.32	0.32			0.37	0.37	0.52	0.52	0.52	0.43	0.43	
Clearance Time (s)	5.0	5.0			5.0		3.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	336	516			602	471	158	1543	586	243	1321	
v/s Ratio Prot		c0.31			c0.12		0.02	c0.27			c0.38	
v/s Ratio Perm	0.01					0.02	0.21		0.01	0.13		
v/c Ratio	0.03	0.95			0.32	0.04	0.45	0.51	0.02	0.30	0.87	
Uniform Delay, d1	20.9	29.8			20.4	18.3	14.7	14.0	10.4	16.6	23.3	
Progression Factor	1.00	1.00			1.00	1.00	1.34	0.30	0.00	1.00	1.00	
Incremental Delay, d2	0.1	29.3			1.4	0.2	7.7	1.1	0.1	3.1	8.3	
Delay (s)	21.0	59.1			21.8	18.5	27.4	5.3	0.1	19.8	31.5	
Level of Service	C	E			C	B	C	A	A	B	C	
Approach Delay (s)		58.5			21.1			6.9			30.8	
Approach LOS		E			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1043: Ashland Ave. □ W Division St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑↱			↑↑	↱
Volume (vph)	117	657	54	128	335	42	41	818	147	2	926	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	9	11	9	11	11	9
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91			0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.91	1.00	1.00	0.88	1.00	0.98			1.00	0.88
Flpb, ped/bikes	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1533	3179	1313	1646	3160	1262	1437	4047			3109	1050
Flt Permitted	0.53	1.00	1.00	0.22	1.00	1.00	0.12	1.00			0.95	1.00
Satd. Flow (perm)	859	3179	1313	389	3160	1262	186	4047			2964	1050
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	129	722	59	141	368	46	45	899	162	2	1018	78
RTOR Reduction (vph)	0	0	39	0	0	26	0	28	0	0	0	48
Lane Group Flow (vph)	129	722	20	141	368	20	45	1033	0	0	1020	30
Confl. Peds. (#/hr)	102		77	77		102	102		145	145		102
Confl. Bikes (#/hr)			7			1			1			1
Heavy Vehicles (%)	1%	4%	2%	0%	1%	0%	7%	6%	8%	0%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	31.0	31.0	31.0	39.0	39.0	39.0	41.0	41.0			35.0	35.0
Effective Green, g (s)	31.0	31.0	31.0	39.0	39.0	39.0	41.0	41.0			35.0	35.0
Actuated g/C Ratio	0.34	0.34	0.34	0.43	0.43	0.43	0.46	0.46			0.39	0.39
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	295	1094	452	238	1369	546	126	1843			1152	408
v/s Ratio Prot		c0.23		c0.03	0.12		0.01	c0.26				
v/s Ratio Perm	0.15		0.02	0.22		0.02	0.15				c0.34	0.03
v/c Ratio	0.44	0.66	0.04	0.59	0.27	0.04	0.36	0.56			0.89	0.07
Uniform Delay, d1	22.8	25.0	19.6	17.2	16.4	14.7	16.6	17.9			25.6	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.61	1.02
Incremental Delay, d2	4.7	3.1	0.2	10.4	0.5	0.1	1.7	1.2			4.9	0.2
Delay (s)	27.4	28.2	19.8	27.6	16.8	14.8	18.3	19.1			20.7	17.8
Level of Service	C	C	B	C	B	B	B	B			C	B
Approach Delay (s)		27.5			19.4			19.1			20.5	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1049: Ashland Ave. □ W Augusta Blvd.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	161	424	52	28	218	28	34	663	46	52	968	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	10	10	10	10	10	10
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		1.00	1.00	1.00	1.00	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1561	1705		1477	1647	1154	1593	2565		1546	2662	
Flt Permitted	0.53	1.00		0.22	1.00	1.00	0.16	1.00		0.29	1.00	
Satd. Flow (perm)	875	1705		340	1647	1154	273	2565		475	2662	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	177	466	57	31	240	31	37	729	51	57	1064	60
RTOR Reduction (vph)	0	7	0	0	0	19	0	8	0	0	6	0
Lane Group Flow (vph)	177	516	0	31	240	12	37	772	0	57	1118	0
Confl. Peds. (#/hr)	34		6	6		34	6		20	20		6
Heavy Vehicles (%)	0%	0%	2%	4%	2%	14%	0%	11%	2%	2%	4%	2%
Parking (#/hr)								20			30	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0	25.0	34.0	34.0		34.0	34.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0	25.0	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.52	0.52		0.52	0.52	
Clearance Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	655		130	633	443	142	1341		248	1392	
v/s Ratio Prot		c0.30			0.15			0.30			c0.42	
v/s Ratio Perm	0.20			0.09		0.01	0.14			0.12		
v/c Ratio	0.53	0.79		0.24	0.38	0.03	0.26	0.58		0.23	0.80	
Uniform Delay, d1	15.4	17.7		13.6	14.4	12.4	8.6	10.6		8.4	12.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	9.3		4.3	1.7	0.1	4.4	1.8		2.2	5.0	
Delay (s)	21.2	27.0		17.8	16.1	12.5	13.0	12.4		10.6	17.7	
Level of Service	C	C		B	B	B	B	B		B	B	
Approach Delay (s)		25.5			15.9			12.4			17.4	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1056: Ashland Ave. □ W Chicago Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	114	502	67	37	383	19	79	601	42	37	1055	84
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	10	10	10	10	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.97	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1604	3126		1606	3219		1595	2779		1590	3062	
Flt Permitted	0.39	1.00		0.25	1.00		0.11	1.00		0.35	1.00	
Satd. Flow (perm)	661	3126		418	3219		189	2779		579	3062	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	125	552	74	41	421	21	87	660	46	41	1159	92
RTOR Reduction (vph)	0	14	0	0	5	0	0	4	0	0	5	0
Lane Group Flow (vph)	125	612	0	41	437	0	87	702	0	41	1246	0
Confl. Peds. (#/hr)	2		103	103		2	61		37	37		61
Heavy Vehicles (%)	3%	3%	1%	0%	2%	0%	0%	4%	0%	0%	1%	0%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		52.2	45.2		47.8	43.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		52.2	45.2		47.8	43.0	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.61	0.53		0.56	0.51	
Clearance Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	3.0		4.0	3.0	
Lane Grp Cap (vph)	186	882		118	908		231	1477		382	1549	
v/s Ratio Prot		c0.20			0.14		c0.03	0.25		0.01	c0.41	
v/s Ratio Perm	0.19			0.10			0.20			0.05		
v/c Ratio	0.67	0.69		0.35	0.48		0.38	0.48		0.11	0.80	
Uniform Delay, d1	27.0	27.2		24.3	25.3		10.5	12.5		8.5	17.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.2	2.4		1.8	0.4		1.4	1.1		0.2	4.5	
Delay (s)	36.2	29.6		26.0	25.7		12.0	13.6		8.6	22.0	
Level of Service	D	C		C	C		B	B		A	C	
Approach Delay (s)		30.7			25.8			13.4			21.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1062: Ashland Ave. □ W Erie St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	27	49	26	12	10	19	28	793	14	18	1150	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)		5.0			5.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.99			0.98		1.00	1.00	0.94	1.00	1.00	0.97
Flpb, ped/bikes		0.99			1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt		0.97			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1550			1415		1596	2759	1108	1584	2892	1112
Flt Permitted		0.92			0.92		0.16	1.00	1.00	0.28	1.00	1.00
Satd. Flow (perm)		1450			1325		275	2759	1108	473	2892	1112
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	30	54	29	13	11	21	31	871	15	20	1264	15
RTOR Reduction (vph)	0	14	0	0	16	0	0	0	5	0	0	5
Lane Group Flow (vph)	0	99	0	0	29	0	31	871	10	20	1264	10
Confl. Peds. (#/hr)	15		12	12		15	3		10	10		3
Heavy Vehicles (%)	0%	4%	0%	8%	0%	11%	0%	7%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		23.0			23.0		59.0	59.0	59.0	59.0	59.0	59.0
Effective Green, g (s)		23.0			23.0		59.0	59.0	59.0	59.0	59.0	59.0
Actuated g/C Ratio		0.26			0.26		0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)		5.0			5.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		370			338		180	1808	726	310	1895	728
v/s Ratio Prot								0.32			c0.44	
v/s Ratio Perm		c0.07			0.02		0.11		0.01	0.04		0.01
v/c Ratio		0.27			0.09		0.17	0.48	0.01	0.06	0.67	0.01
Uniform Delay, d1		26.8			25.5		6.0	7.8	5.4	5.6	9.5	5.4
Progression Factor		1.00			1.00		0.53	0.47	0.15	1.00	1.00	1.00
Incremental Delay, d2		1.8			0.5		1.7	0.8	0.0	0.4	1.9	0.0
Delay (s)		28.5			26.0		4.9	4.4	0.9	6.0	11.4	5.4
Level of Service		C			C		A	A	A	A	B	A
Approach Delay (s)		28.5			26.0			4.4			11.2	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1066: Ashland Ave. □ W Grand Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↑	↱
Volume (vph)	86	734	174	56	315	35	75	667	63	90	912	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	3.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	0.89
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.98	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1504	2878		1496	2898		1408	2656		1565	2973	1059
Flt Permitted	0.42	1.00		0.19	1.00		0.24	1.00		0.21	1.00	1.00
Satd. Flow (perm)	663	2878		304	2898		349	2656		343	2973	1059
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	95	807	191	62	346	38	82	733	69	99	1002	57
RTOR Reduction (vph)	0	23	0	0	9	0	0	8	0	0	0	24
Lane Group Flow (vph)	95	975	0	62	375	0	82	794	0	99	1002	33
Confl. Peds. (#/hr)	41		61	61		41	58		16	16		58
Heavy Vehicles (%)	5%	6%	5%	5%	8%	6%	11%	8%	10%	2%	2%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	37.6	37.6		29.8	29.8		35.8	35.8		44.4	44.4	44.4
Effective Green, g (s)	37.6	37.6		29.8	29.8		35.8	35.8		44.4	44.4	44.4
Actuated g/C Ratio	0.42	0.42		0.33	0.33		0.40	0.40		0.49	0.49	0.49
Clearance Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	321	1202		100	959		138	1056		245	1466	522
v/s Ratio Prot	0.02	c0.34			0.13			c0.30		0.03	c0.34	
v/s Ratio Perm	0.11			0.20			0.23			0.17		0.03
v/c Ratio	0.30	0.81		0.62	0.39		0.59	0.75		0.40	0.68	0.06
Uniform Delay, d1	16.6	23.1		25.3	23.1		21.4	23.3		14.0	17.4	11.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.44	1.25	2.16
Incremental Delay, d2	0.5	6.0		25.6	1.2		17.4	5.0		0.8	2.0	0.2
Delay (s)	17.1	29.1		50.9	24.3		38.8	28.2		20.9	23.8	26.0
Level of Service	B	C		D	C		D	C		C	C	C
Approach Delay (s)		28.0			28.0			29.2			23.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c   Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. □ W Fulton St. (West)

8/8/2013

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Volume (vph)	40	29	0	700	941	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	0.97			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.94			1.00	1.00	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1253			2908	2975	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1253			2908	2975	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	44	32	0	769	1034	26
RTOR Reduction (vph)	25	0	0	0	2	0
Lane Group Flow (vph)	51	0	0	769	1058	0
Confl. Peds. (#/hr)	23	12				
Heavy Vehicles (%)	30%	14%	0%	8%	5%	12%
Parking (#/hr)				0	0	
Turn Type	NA		custom	NA	NA	
Protected Phases	4		5 10	2 10	6	
Permitted Phases			2			
Actuated Green, G (s)	19.0			57.0	49.0	
Effective Green, g (s)	19.0			57.0	49.0	
Actuated g/C Ratio	0.21			0.63	0.54	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	264			1841	1619	
v/s Ratio Prot	c0.04			c0.26	c0.36	
v/s Ratio Perm						
v/c Ratio	0.19			0.42	0.65	
Uniform Delay, d1	29.2			8.2	14.5	
Progression Factor	1.00			0.03	1.00	
Incremental Delay, d2	1.6			0.6	2.1	
Delay (s)	30.8			0.9	16.6	
Level of Service	C			A	B	
Approach Delay (s)	30.8			0.9	16.6	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1074: Ashland Ave. □ W Fulton St. (East)

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↗		↑↱		↰	↑↑
Volume (vph)	6	15	700	15	29	941
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10
Total Lost time (s)	3.0		3.0		2.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.91		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		1.00		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1097		2797		1596	2827
Flt Permitted	0.99		1.00		0.29	1.00
Satd. Flow (perm)	1097		2797		484	2827
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	7	16	769	16	32	1034
RTOR Reduction (vph)	13	0	2	0	0	0
Lane Group Flow (vph)	10	0	783	0	32	1034
Confl. Peds. (#/hr)	12	23				
Heavy Vehicles (%)	33%	20%	8%	13%	0%	5%
Parking (#/hr)			0			8
Turn Type	NA		NA		custom	NA
Protected Phases	8		2		1 14	6 14
Permitted Phases					6	
Actuated Green, G (s)	19.0		49.0		60.0	57.0
Effective Green, g (s)	19.0		49.0		60.0	57.0
Actuated g/C Ratio	0.21		0.54		0.67	0.63
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	231		1522		458	1790
v/s Ratio Prot	c0.01		0.28		c0.01	c0.37
v/s Ratio Perm					0.04	
v/c Ratio	0.04		0.51		0.07	0.58
Uniform Delay, d1	28.3		13.0		5.6	9.5
Progression Factor	1.00		0.11		0.10	0.05
Incremental Delay, d2	0.4		1.1		0.2	1.0
Delay (s)	28.6		2.6		0.8	1.5
Level of Service	C		A		A	A
Approach Delay (s)	28.6		2.6			1.5
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1077: Ashland Ave. □ W Lake St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	35	221	37	6	124	42	13	666	29	62	899	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	10	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.99			0.99		1.00	1.00	0.86	1.00	1.00	0.72
Flpb, ped/bikes		1.00			1.00		0.96	1.00	1.00	0.97	1.00	1.00
Frt		0.98			0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1623			1590		1529	2518	781	1542	3099	986
Flt Permitted		0.95			0.99		0.24	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)		1545			1571		385	2518	781	549	3099	986
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	38	243	41	7	136	46	14	732	32	68	988	30
RTOR Reduction (vph)	0	6	0	0	13	0	0	0	12	0	0	11
Lane Group Flow (vph)	0	316	0	0	176	0	14	732	20	68	988	19
Confl. Peds. (#/hr)	10		36	36		10	77		34	34		77
Confl. Bikes (#/hr)			3						2			6
Heavy Vehicles (%)	9%	8%	3%	50%	7%	7%	0%	9%	10%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		26.0			26.0		56.0	56.0	56.0	56.0	56.0	56.0
Effective Green, g (s)		26.0			26.0		56.0	56.0	56.0	56.0	56.0	56.0
Actuated g/C Ratio		0.29			0.29		0.62	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)		446			453		239	1566	485	341	1928	613
v/s Ratio Prot								0.29			c0.32	
v/s Ratio Perm		c0.20			0.11		0.04		0.03	0.12		0.02
v/c Ratio		0.71			0.39		0.06	0.47	0.04	0.20	0.51	0.03
Uniform Delay, d1		28.6			25.6		6.7	9.1	6.6	7.3	9.4	6.5
Progression Factor		1.00			1.00		1.22	1.36	1.78	0.33	0.28	0.08
Incremental Delay, d2		9.2			2.5		0.4	1.0	0.2	1.1	0.8	0.1
Delay (s)		37.8			28.1		8.6	13.3	11.9	3.6	3.5	0.6
Level of Service		D			C		A	B	B	A	A	A
Approach Delay (s)		37.8			28.1			13.1			3.4	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1079: Ashland Ave. □ W Washington Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱	↰	↑↑↑			↑↑↱	
Volume (vph)	0	0	0	7	98	10	106	880	0	0	1029	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.91	
Frpb, ped/bikes				1.00	1.00	0.96	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	0.99	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.99	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1589	3160	1246	1599	4291			4134	
Flt Permitted				0.95	1.00	1.00	0.19	1.00			1.00	
Satd. Flow (perm)				1589	3160	1246	319	4291			4134	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	8	108	11	116	967	0	0	1131	91
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	0	0	10	0
Lane Group Flow (vph)	0	0	0	8	108	3	116	967	0	0	1212	0
Confl. Peds. (#/hr)	23		4	4		23	56		27	27		56
Confl. Bikes (#/hr)			1			2						3
Heavy Vehicles (%)	0%	0%	0%	0%	1%	10%	2%	7%	0%	0%	4%	5%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)				26.0	26.0	26.0	56.0	56.0			56.0	
Effective Green, g (s)				26.0	26.0	26.0	56.0	56.0			56.0	
Actuated g/C Ratio				0.29	0.29	0.29	0.62	0.62			0.62	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Grp Cap (vph)				459	912	359	198	2669			2572	
v/s Ratio Prot					c0.03			0.23			0.29	
v/s Ratio Perm				0.01		0.00	c0.36					
v/c Ratio				0.02	0.12	0.01	0.59	0.36			0.47	
Uniform Delay, d1				22.9	23.6	22.8	10.1	8.3			9.1	
Progression Factor				1.00	1.00	1.00	1.25	0.46			1.18	
Incremental Delay, d2				0.1	0.3	0.0	11.4	0.4			0.6	
Delay (s)				22.9	23.8	22.9	24.0	4.2			11.3	
Level of Service				C	C	C	C	A			B	
Approach Delay (s)		0.0			23.7			6.3			11.3	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1080: Ashland Ave. □ W Warren Blvd.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↑↱		↰	↑↑↑	
Volume (vph)	108	267	41	0	0	0	0	825	4	42	887	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		1.00	0.91	
Frpb, ped/bikes		1.00						1.00		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		0.99						1.00		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		2871						3892		1400	3850	
Flt Permitted		0.99						1.00		0.28	1.00	
Satd. Flow (perm)		2871						3892		414	3850	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	119	293	45	0	0	0	0	907	4	46	975	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	448	0	0	0	0	0	911	0	46	975	0
Confl. Peds. (#/hr)	3		5	5		3	32		29	29		32
Confl. Bikes (#/hr)			4						2			2
Heavy Vehicles (%)	7%	3%	2%	0%	0%	0%	0%	6%	25%	5%	4%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		26.0						56.0		56.0	56.0	
Effective Green, g (s)		26.0						56.0		56.0	56.0	
Actuated g/C Ratio		0.29						0.62		0.62	0.62	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Lane Grp Cap (vph)		829						2421		257	2395	
v/s Ratio Prot								0.23			c0.25	
v/s Ratio Perm		0.16								0.11		
v/c Ratio		0.54						0.38		0.18	0.41	
Uniform Delay, d1		27.0						8.4		7.2	8.6	
Progression Factor		1.00						0.31		0.11	0.09	
Incremental Delay, d2		2.5						0.4		1.4	0.5	
Delay (s)		29.5						3.0		2.1	1.2	
Level of Service		C						A		A	A	
Approach Delay (s)		29.5			0.0			3.0			1.3	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1082: Ashland Ave. □ W Madison St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑↱		↰	↑↑↱	
Volume (vph)	47	278	39	20	187	73	30	759	5	58	952	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1485	2833		1580	2771		1404	4249		1563	4425	
Flt Permitted	0.58	1.00		0.34	1.00		0.16	1.00		0.25	1.00	
Satd. Flow (perm)	902	2833		563	2771		237	4249		408	4425	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	52	305	43	22	205	80	33	834	5	64	1046	33
RTOR Reduction (vph)	0	12	0	0	21	0	0	1	0	0	4	0
Lane Group Flow (vph)	52	336	0	22	265	0	33	838	0	64	1075	0
Confl. Peds. (#/hr)	16		23	23		16	25		17	17		25
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	6%	10%	10%	0%	11%	5%	17%	8%	0%	5%	3%	7%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8			2			6		
Actuated Green, G (s)	33.0	33.0		49.0	49.0		33.0	33.0		33.0	33.0	
Effective Green, g (s)	33.0	33.0		49.0	49.0		33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.37	0.37		0.54	0.54		0.37	0.37		0.37	0.37	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	330	1038		306	1508		86	1557		149	1622	
v/s Ratio Prot		c0.12			c0.10			0.20			c0.24	
v/s Ratio Perm	0.06			0.04			0.14			0.16		
v/c Ratio	0.16	0.32		0.07	0.18		0.38	0.54		0.43	0.66	
Uniform Delay, d1	19.2	20.5		9.7	10.3		21.0	22.5		21.4	23.8	
Progression Factor	1.00	1.00		1.00	1.00		0.74	0.76		0.36	0.38	
Incremental Delay, d2	1.0	0.8		0.5	0.3		10.7	1.1		8.3	2.0	
Delay (s)	20.2	21.3		10.2	10.6		26.3	18.2		16.0	11.2	
Level of Service	C	C		B	B		C	B		B	B	
Approach Delay (s)		21.2			10.5			18.5			11.5	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑		↰	↑↑			↑↑	↱		↑↑↱	
Volume (vph)	160	558	0	250	569	1	0	633	331	0	783	228
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95	1.00		0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1628	3288		1589	3143			3033	1192		4214	
Flt Permitted	0.41	1.00		0.24	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	710	3288		403	3143			3033	1192		4214	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	613	0	275	625	1	0	696	364	0	860	251
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	29	0	58	0
Lane Group Flow (vph)	176	613	0	275	626	0	0	696	335	0	1053	0
Confl. Peds. (#/hr)	1		5	5		1	20		15	15		20
Confl. Bikes (#/hr)			3									2
Heavy Vehicles (%)	5%	4%	0%	4%	5%	100%	0%	9%	9%	0%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	8	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA	pm+ov		NA	
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4			8					2			
Actuated Green, G (s)	27.0	27.0		38.0	38.0			44.0	52.0		44.0	
Effective Green, g (s)	27.0	27.0		38.0	38.0			44.0	52.0		44.0	
Actuated g/C Ratio	0.30	0.30		0.42	0.42			0.49	0.58		0.49	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Lane Grp Cap (vph)	213	986		275	1327			1482	688		2060	
v/s Ratio Prot		0.19		c0.09	0.20			0.23	0.04		c0.25	
v/s Ratio Perm	0.25			c0.33					0.24			
v/c Ratio	0.83	0.62		1.00	0.47			0.47	0.49		0.51	
Uniform Delay, d1	29.3	27.1		23.3	18.8			15.3	11.2		15.7	
Progression Factor	1.00	1.00		1.00	1.00			1.48	0.98		0.45	
Incremental Delay, d2	29.3	2.9		54.3	1.2			0.9	2.1		0.7	
Delay (s)	58.6	30.1		77.6	20.0			23.5	13.1		7.8	
Level of Service	E	C		E	B			C	B		A	
Approach Delay (s)		36.4			37.6			19.9			7.8	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1084: Ashland Ave. □ W Monroe St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱	↱	↰	↑↱	
Volume (vph)	1	72	30	46	20	21	16	906	68	73	896	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.91	0.91	1.00	0.95	
Frpb, ped/bikes		0.99			1.00		1.00	1.00	0.91	1.00	1.00	
Flpb, ped/bikes		1.00			0.99		0.99	1.00	1.00	0.99	1.00	
Frt		0.96			0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1563			1473		1579	2516	894	1558	2915	
Flt Permitted		1.00			0.83		0.26	1.00	1.00	0.24	1.00	
Satd. Flow (perm)		1562			1257		433	2516	894	396	2915	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	79	33	51	22	23	18	996	75	80	985	2
RTOR Reduction (vph)	0	17	0	0	13	0	0	1	19	0	0	0
Lane Group Flow (vph)	0	96	0	0	83	0	18	1003	48	80	987	0
Confl. Peds. (#/hr)	5		15	15		5	16		39	39		16
Confl. Bikes (#/hr)			2			1			1			
Heavy Vehicles (%)	0%	3%	0%	7%	5%	5%	0%	8%	3%	1%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		18.0			18.0		64.0	64.0	64.0	64.0	64.0	
Effective Green, g (s)		18.0			18.0		64.0	64.0	64.0	64.0	64.0	
Actuated g/C Ratio		0.20			0.20		0.71	0.71	0.71	0.71	0.71	
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		312			251		307	1789	635	281	2072	
v/s Ratio Prot								c0.40			0.34	
v/s Ratio Perm		0.06			c0.07		0.04		0.05	0.20		
v/c Ratio		0.31			0.33		0.06	0.56	0.08	0.28	0.48	
Uniform Delay, d1		30.7			30.8		3.9	6.2	4.0	4.7	5.7	
Progression Factor		1.00			1.00		0.77	0.48	0.96	0.33	0.30	
Incremental Delay, d2		2.6			3.5		0.3	1.0	0.2	2.0	0.6	
Delay (s)		33.2			34.4		3.3	4.0	4.0	3.5	2.3	
Level of Service		C			C		A	A	A	A	A	
Approach Delay (s)		33.2			34.4			4.0			2.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↱		↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	202	141	145	75	883	0	0	889	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		1.00	0.95			0.95	1.00
Frpb, ped/bikes					0.98		1.00	1.00			1.00	0.90
Flpb, ped/bikes					0.97		0.99	1.00			1.00	1.00
Frt					0.96		1.00	1.00			1.00	0.85
Flt Protected					0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)					2730		1629	2495			2897	1077
Flt Permitted					0.98		0.24	1.00			1.00	1.00
Satd. Flow (perm)					2730		411	2495			2897	1077
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	222	155	159	82	970	0	0	977	73
RTOR Reduction (vph)	0	0	0	0	52	0	0	0	0	0	0	28
Lane Group Flow (vph)	0	0	0	0	484	0	82	970	0	0	977	45
Confl. Peds. (#/hr)	32		53	53		32	45		25	25		45
Confl. Bikes (#/hr)			1			1			2			3
Heavy Vehicles (%)	0%	0%	0%	5%	6%	3%	0%	8%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								54			12	12
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					27.0		55.0	55.0			55.0	55.0
Effective Green, g (s)					27.0		55.0	55.0			55.0	55.0
Actuated g/C Ratio					0.30		0.61	0.61			0.61	0.61
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					819		251	1524			1770	658
v/s Ratio Prot								c0.39			0.34	
v/s Ratio Perm					0.18		0.20					0.04
v/c Ratio					0.59		0.33	0.64			0.55	0.07
Uniform Delay, d1					26.8		8.5	11.1			10.3	7.1
Progression Factor					1.00		2.07	2.11			0.50	0.66
Incremental Delay, d2					3.1		3.2	1.9			1.1	0.2
Delay (s)					29.9		20.9	25.4			6.2	4.9
Level of Service					C		C	C			A	A
Approach Delay (s)		0.0			29.9			25.1			6.1	
Approach LOS		A			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1086: Ashland Ave. □ W Jackson Blvd.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		↰↑	↱					↑↑	↱	↰	↑↑	
Volume (vph)	34	166	85	0	0	0	0	760	67	91	801	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3233	1458					3033	1187	1616	2755	
Flt Permitted		0.99	1.00					1.00	1.00	0.29	1.00	
Satd. Flow (perm)		3233	1458					3033	1187	488	2755	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	37	182	93	0	0	0	0	835	74	100	880	0
RTOR Reduction (vph)	0	0	64	0	0	0	0	0	30	0	0	0
Lane Group Flow (vph)	0	219	29	0	0	0	0	835	44	100	880	0
Confl. Peds. (#/hr)	12		16	16		12			9	9		17
Heavy Vehicles (%)	3%	5%	2%	0%	0%	0%	2%	9%	6%	2%	8%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		28.0	28.0					53.0	53.0	53.0	53.0	
Effective Green, g (s)		28.0	28.0					53.0	53.0	53.0	53.0	
Actuated g/C Ratio		0.31	0.31					0.59	0.59	0.59	0.59	
Clearance Time (s)		5.0	5.0					4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		1005	453					1786	699	287	1622	
v/s Ratio Prot								0.28			c0.32	
v/s Ratio Perm		0.07	0.02						0.04	0.20		
v/c Ratio		0.22	0.06					0.47	0.06	0.35	0.54	
Uniform Delay, d1		22.9	21.8					10.5	7.9	9.6	11.2	
Progression Factor		1.00	1.00					1.00	1.00	1.41	1.44	
Incremental Delay, d2		0.5	0.3					0.9	0.2	2.8	1.1	
Delay (s)		23.4	22.1					11.4	8.1	16.2	17.2	
Level of Service		C	C					B	A	B	B	
Approach Delay (s)		23.0			0.0			11.1			17.1	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1088: Ashland Ave. □ W Van Buren St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱	↰	↰↑↑			↑↑↱	
Volume (vph)	0	0	0	748	287	193	276	905	0	0	864	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	10	10	10	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	0.86	0.86			0.91	
Frpb, ped/bikes				1.00	1.00	0.96	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1632	3149	1353	1271	3831			4228	
Flt Permitted				0.95	1.00	1.00	0.19	0.74			1.00	
Satd. Flow (perm)				1632	3149	1353	252	2863			4228	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	822	315	212	303	995	0	0	949	173
RTOR Reduction (vph)	0	0	0	0	0	95	0	0	0	0	26	0
Lane Group Flow (vph)	0	0	0	822	315	117	212	1086	0	0	1096	0
Confl. Peds. (#/hr)	19		2	2		19	13		9	9		13
Confl. Bikes (#/hr)						1			2			2
Heavy Vehicles (%)	0%	0%	0%	1%	5%	5%	8%	9%	0%	0%	5%	7%
Parking (#/hr)								0			0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)				29.0	29.0	29.0	63.0	63.0			48.0	
Effective Green, g (s)				29.0	29.0	29.0	63.0	63.0			48.0	
Actuated g/C Ratio				0.29	0.29	0.29	0.63	0.63			0.48	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Grp Cap (vph)				473	913	392	270	1910			2029	
v/s Ratio Prot					0.10		c0.09	0.06			0.26	
v/s Ratio Perm				c0.50		0.09	c0.41	0.30				
v/c Ratio				1.74	0.35	0.30	0.79	0.57			0.54	
Uniform Delay, d1				35.5	28.0	27.6	22.5	10.7			18.3	
Progression Factor				1.00	1.00	1.00	0.59	0.24			1.00	
Incremental Delay, d2				340.8	1.0	1.9	14.5	0.8			1.0	
Delay (s)				376.3	29.0	29.5	27.8	3.4			19.3	
Level of Service				F	C	C	C	A			B	
Approach Delay (s)		0.0			240.7			7.4			19.3	
Approach LOS		A			F			A			B	

Intersection Summary			
HCM 2000 Control Delay	94.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1089: Ashland Ave. □ W Congress Pkwy

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↑↱		↰	↑↑↑	
Volume (vph)	150	171	221	0	0	0	0	1031	344	188	1424	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	10	10	10
Total Lost time (s)		6.0	6.0					4.0		6.0	6.0	
Lane Util. Factor		0.95	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98					1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.96		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3155	1471					4058		1520	4258	
Flt Permitted		0.98	1.00					1.00		0.10	1.00	
Satd. Flow (perm)		3155	1471					4058		162	4258	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	188	243	0	0	0	0	1133	378	207	1565	0
RTOR Reduction (vph)	0	0	57	0	0	0	0	60	0	0	0	0
Lane Group Flow (vph)	0	353	186	0	0	0	0	1451	0	207	1565	0
Confl. Peds. (#/hr)			6	6			2		3	3		2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	7%	5%	2%	0%	0%	0%	0%	9%	2%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm					NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		25.0	25.0					48.0		63.0	63.0	
Effective Green, g (s)		25.0	25.0					48.0		63.0	63.0	
Actuated g/C Ratio		0.25	0.25					0.48		0.63	0.63	
Clearance Time (s)		6.0	6.0					4.0		6.0	6.0	
Lane Grp Cap (vph)		788	367					1947		251	2682	
v/s Ratio Prot								0.36		c0.09	0.37	
v/s Ratio Perm		0.11	c0.13							c0.43		
v/c Ratio		0.45	0.51					0.75		0.82	0.58	
Uniform Delay, d1		31.7	32.2					21.0		27.0	10.8	
Progression Factor		1.00	1.00					0.37		1.11	0.97	
Incremental Delay, d2		1.8	4.9					2.2		2.9	0.1	
Delay (s)		33.5	37.1					9.9		32.9	10.5	
Level of Service		C	D					A		C	B	
Approach Delay (s)		35.0			0.0			9.9			13.1	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1090: Ashland Ave. □ W Harrison St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↑↱		↰	↑↑↱		↰	↑↑↱	
Volume (vph)	174	123	43	100	202	48	43	1219	56	26	1435	374
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1492	2943		1496	2899		1652	4133		1582	4227	
Flt Permitted	0.44	0.76		0.59	1.00		0.07	1.00		0.14	1.00	
Satd. Flow (perm)	690	2281		924	2899		126	4133		229	4227	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	191	135	47	110	222	53	47	1340	62	29	1577	411
RTOR Reduction (vph)	0	13	0	0	21	0	0	5	0	0	47	0
Lane Group Flow (vph)	117	243	0	110	255	0	47	1397	0	29	1941	0
Confl. Peds. (#/hr)	31		71	71		31	22		41	41		22
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	2%	0%	1%	7%	0%	0%	9%	7%	4%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0		18.0	18.0		55.0	55.0		55.0	55.0	
Effective Green, g (s)	35.0	35.0		18.0	18.0		55.0	55.0		55.0	55.0	
Actuated g/C Ratio	0.35	0.35		0.18	0.18		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	353	891		166	521		69	2273		125	2324	
v/s Ratio Prot	c0.05	0.04			0.09			0.34			c0.46	
v/s Ratio Perm	0.07	0.06		c0.12			0.37			0.13		
v/c Ratio	0.33	0.27		0.66	0.49		0.68	0.61		0.23	0.84	
Uniform Delay, d1	23.1	23.4		38.2	36.9		16.2	15.3		11.6	18.7	
Progression Factor	1.00	1.00		1.00	1.00		0.32	0.23		0.37	0.34	
Incremental Delay, d2	2.5	0.8		18.9	3.3		39.2	1.1		3.7	3.3	
Delay (s)	25.6	24.1		57.1	40.1		44.4	4.6		8.1	9.5	
Level of Service	C	C		E	D		D	A		A	A	
Approach Delay (s)		24.6			45.0			5.9			9.5	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✥		↰	↑↑↱			↑↑↱	
Volume (vph)	109	0	14	2	1	9	112	1258	5	1	1029	453
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0		4.0	4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00		1.00	0.91			0.91	
Frpb, ped/bikes	1.00		0.99		0.98		1.00	1.00			0.98	
Flpb, ped/bikes	0.99		1.00		1.00		1.00	1.00			1.00	
Frt	1.00		0.85		0.90		1.00	1.00			0.95	
Flt Protected	0.95		1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)	3065		1409		1573		1649	4249			4213	
Flt Permitted	0.75		1.00		0.99		0.11	1.00			0.94	
Satd. Flow (perm)	2416		1409		1573		195	4249			3958	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	120	0	15	2	1	10	123	1382	5	1	1131	498
RTOR Reduction (vph)	0	0	11	0	7	0	0	0	0	0	79	0
Lane Group Flow (vph)	120	0	4	0	6	0	123	1387	0	0	1551	0
Confl. Peds. (#/hr)	9		1	1		9	14		21	21		14
Confl. Bikes (#/hr)									4			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA		Perm	NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	26.0		26.0		26.0		65.0	65.0			65.0	
Effective Green, g (s)	26.0		26.0		26.0		65.0	65.0			65.0	
Actuated g/C Ratio	0.26		0.26		0.26		0.65	0.65			0.65	
Clearance Time (s)	5.0		5.0		5.0		4.0	4.0			4.0	
Lane Grp Cap (vph)	628		366		408		126	2761			2572	
v/s Ratio Prot								0.33				
v/s Ratio Perm	c0.05		0.00		0.00		c0.63				0.39	
v/c Ratio	0.19		0.01		0.01		0.98	0.50			0.60	
Uniform Delay, d1	28.8		27.5		27.5		16.8	9.1			10.1	
Progression Factor	1.00		1.00		1.00		0.59	0.23			0.23	
Incremental Delay, d2	0.7		0.1		0.1		68.6	0.6			0.6	
Delay (s)	29.5		27.5		27.5		78.6	2.6			2.9	
Level of Service	C		C		C		E	A			A	
Approach Delay (s)		29.3			27.5			8.8			2.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1092: Ashland Ave. □ W Polk St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↑↱		↰	↑↑↱	
Volume (vph)	86	16	37	6	28	57	83	1287	15	30	886	223
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		0.95			0.94		1.00	1.00		1.00	0.98	
Flpb, ped/bikes		0.96			0.99		0.99	1.00		0.99	1.00	
Frt		0.96			0.92		1.00	1.00		1.00	0.97	
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1418			1425		1641	4185		1632	4111	
Flt Permitted		0.79			0.98		0.19	1.00		0.15	1.00	
Satd. Flow (perm)		1151			1406		330	4185		250	4111	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	95	18	41	7	31	63	91	1414	16	33	974	245
RTOR Reduction (vph)	0	13	0	0	35	0	0	1	0	0	44	0
Lane Group Flow (vph)	0	141	0	0	66	0	91	1429	0	33	1175	0
Confl. Peds. (#/hr)	60		129	129		60	14		39	39		14
Confl. Bikes (#/hr)			4			6			5			
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	8%	20%	0%	6%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Effective Green, g (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Actuated g/C Ratio		0.28			0.28		0.64	0.64		0.64	0.64	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		322			393		211	2678		160	2631	
v/s Ratio Prot								c0.34			0.29	
v/s Ratio Perm		c0.12			0.05		0.28			0.13		
v/c Ratio		0.44			0.17		0.43	0.53		0.21	0.45	
Uniform Delay, d1		29.5			27.2		9.0	9.8		7.5	9.1	
Progression Factor		1.00			1.00		1.01	0.91		1.05	0.94	
Incremental Delay, d2		4.3			0.9		6.1	0.7		2.4	0.5	
Delay (s)		33.8			28.1		15.1	9.7		10.2	9.0	
Level of Service		C			C		B	A		B	A	
Approach Delay (s)		33.8			28.1			10.1			9.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	36	90	37	44	169	55	91	997	51	69	561	167
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.90	1.00	1.00	0.98	1.00	1.00	0.98	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1441	1556	1369	1526	1570	1187	1620	4064		1566	4039	
Flt Permitted	0.54	1.00	1.00	0.69	1.00	1.00	0.33	1.00		0.21	1.00	
Satd. Flow (perm)	822	1556	1369	1105	1570	1187	555	4064		347	4039	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	40	99	41	48	186	60	100	1096	56	76	616	184
RTOR Reduction (vph)	0	0	30	0	0	43	0	6	0	0	54	0
Lane Group Flow (vph)	40	99	11	48	186	17	100	1146	0	76	746	0
Confl. Peds. (#/hr)	98		20	20		98	15		23	23		15
Confl. Bikes (#/hr)			2			5			1			3
Heavy Vehicles (%)	0%	8%	0%	2%	7%	2%	0%	10%	16%	4%	8%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	63.0	63.0		63.0	63.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	63.0	63.0		63.0	63.0	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.63	0.63		0.63	0.63	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	230	435	383	309	439	332	349	2560		218	2544	
v/s Ratio Prot		0.06			c0.12			c0.28			0.18	
v/s Ratio Perm	0.05		0.01	0.04		0.01	0.18			0.22		
v/c Ratio	0.17	0.23	0.03	0.16	0.42	0.05	0.29	0.45		0.35	0.29	
Uniform Delay, d1	27.2	27.7	26.1	27.1	29.4	26.3	8.4	9.5		8.8	8.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.60	0.55		1.56	1.44	
Incremental Delay, d2	1.6	1.2	0.1	1.1	3.0	0.3	0.5	0.1		4.0	0.3	
Delay (s)	28.9	28.9	26.3	28.2	32.4	26.6	5.5	5.4		17.7	12.4	
Level of Service	C	C	C	C	C	C	A	A		B	B	
Approach Delay (s)		28.3			30.5			5.4			12.8	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1094: Ashland Ave. □ W Roosevelt Rd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	126	663	83	124	899	229	122	1088	93	166	498	89
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.93	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1564	3040	1321	1504	3099	1337	2958	2916	1148	3036	3040	1181
Flt Permitted	0.13	1.00	1.00	0.21	1.00	1.00	0.35	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	215	3040	1321	326	3099	1337	1105	2916	1148	364	3040	1181
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	138	729	91	136	988	252	134	1196	102	182	547	98
RTOR Reduction (vph)	0	0	63	0	0	157	0	0	57	0	0	64
Lane Group Flow (vph)	138	729	28	136	988	95	134	1196	45	182	547	34
Confl. Peds. (#/hr)	28		24	24		28	29		52	52		29
Confl. Bikes (#/hr)						4			3			1
Heavy Vehicles (%)	2%	5%	4%	6%	3%	2%	4%	4%	1%	2%	5%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	41.9	30.7	30.7	42.1	30.8	30.8	41.9	35.0	35.0	42.1	35.1	35.1
Effective Green, g (s)	41.9	30.7	30.7	42.1	30.8	30.8	41.9	35.0	35.0	42.1	35.1	35.1
Actuated g/C Ratio	0.42	0.31	0.31	0.42	0.31	0.31	0.42	0.35	0.35	0.42	0.35	0.35
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	5.0	3.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	241	933	405	270	954	411	590	1020	401	340	1067	414
v/s Ratio Prot	c0.06	0.24		0.06	c0.32		0.02	c0.41		c0.04	0.18	
v/s Ratio Perm	0.18		0.02	0.15		0.07	0.08		0.04	0.19		0.03
v/c Ratio	0.57	0.78	0.07	0.50	1.04	0.23	0.23	1.17	0.11	0.54	0.51	0.08
Uniform Delay, d1	21.7	31.6	24.5	19.7	34.6	25.8	18.0	32.5	22.0	22.7	25.7	21.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.93	0.77	1.39	0.51	0.12
Incremental Delay, d2	5.2	6.5	0.3	3.1	38.7	1.3	0.2	87.0	0.5	1.6	1.7	0.4
Delay (s)	26.8	38.1	24.9	22.7	73.3	27.1	14.6	117.1	17.5	33.0	14.7	3.0
Level of Service	C	D	C	C	E	C	B	F	B	C	B	A
Approach Delay (s)		35.2			59.9			100.4			17.4	
Approach LOS		D			E			F			B	

Intersection Summary			
HCM 2000 Control Delay	59.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1096: Ashland Ave. □ W 13th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	24	2	24	0	2	1	61	1232	3	3	655	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	11	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00		1.00	1.00	
Frt		0.94			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1494			1708		1471	2805		1647	2828	
Flt Permitted		0.85			1.00		0.36	1.00		0.18	1.00	
Satd. Flow (perm)		1297			1708		552	2805		320	2828	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	26	2	26	0	2	1	67	1354	3	3	720	51
RTOR Reduction (vph)	0	24	0	0	1	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	30	0	0	2	0	67	1357	0	3	769	0
Confl. Peds. (#/hr)	2		7	7		2	10		8	8		10
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	8%	0%	8%	0%	0%	0%	7%	8%	33%	0%	6%	2%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.3			8.3		83.7	83.7		83.7	83.7	
Effective Green, g (s)		8.3			8.3		83.7	83.7		83.7	83.7	
Actuated g/C Ratio		0.08			0.08		0.84	0.84		0.84	0.84	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		107			141		462	2347		267	2367	
v/s Ratio Prot					0.00			c0.48			0.27	
v/s Ratio Perm		c0.02					0.12			0.01		
v/c Ratio		0.28			0.01		0.15	0.58		0.01	0.32	
Uniform Delay, d1		43.1			42.1		1.5	2.6		1.3	1.8	
Progression Factor		1.00			1.00		1.00	1.00		1.16	0.97	
Incremental Delay, d2		3.0			0.1		0.7	1.0		0.1	0.3	
Delay (s)		46.1			42.2		2.2	3.6		1.6	2.1	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		46.1			42.2			3.6			2.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1098: Ashland Ave. □ W 14th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	21	0	14	3	1	3	31	1377	0	3	563	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	10	9	11	10	9
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.98		0.99	1.00		1.00	1.00	
Frt		0.95			0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1567			1628		1583	2641		1653	2775	
Flt Permitted		0.88			0.95		0.39	1.00		0.12	1.00	
Satd. Flow (perm)		1419			1579		651	2641		201	2775	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	23	0	15	3	1	3	34	1513	0	3	619	12
RTOR Reduction (vph)	0	11	0	0	2	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	27	0	0	5	0	34	1513	0	3	630	0
Confl. Peds. (#/hr)			30	30			9		6	6		9
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	5%	0%	0%	0%	0%	0%	3%	10%	0%	0%	9%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.0			26.0		71.0	71.0		71.0	71.0	
Effective Green, g (s)		26.0			26.0		71.0	71.0		71.0	71.0	
Actuated g/C Ratio		0.25			0.25		0.68	0.68		0.68	0.68	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		351			390		440	1785		135	1876	
v/s Ratio Prot								c0.57			0.23	
v/s Ratio Perm		c0.02			0.00		0.05			0.01		
v/c Ratio		0.08			0.01		0.08	0.85		0.02	0.34	
Uniform Delay, d1		30.3			29.8		5.8	12.9		5.6	7.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.1		0.3	5.2		0.3	0.5	
Delay (s)		30.7			29.9		6.2	18.1		5.9	7.6	
Level of Service		C			C		A	B		A	A	
Approach Delay (s)		30.7			29.9			17.8			7.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1103: Ashland Ave. □ W 18th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	39	154	59	59	246	148	54	1287	53	42	642	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.83	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.91	1.00	1.00	0.97	1.00	1.00	0.96	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1384	1556	1287	1521	1570	1162	1507	2620		1492	2529	
Flt Permitted	0.44	1.00	1.00	0.58	1.00	1.00	0.32	1.00		0.09	1.00	
Satd. Flow (perm)	636	1556	1287	935	1570	1162	513	2620		146	2529	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	43	169	65	65	270	163	59	1414	58	46	705	32
RTOR Reduction (vph)	0	0	45	0	0	35	0	3	0	0	3	0
Lane Group Flow (vph)	43	169	20	65	270	128	59	1469	0	46	734	0
Confl. Peds. (#/hr)	117		28	28		117	39		43	43		39
Confl. Bikes (#/hr)			6			3						1
Heavy Vehicles (%)	5%	8%	5%	2%	7%	2%	2%	8%	15%	7%	12%	14%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0	58.0	58.0		58.0	58.0	
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0	58.0	58.0		58.0	58.0	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.58	0.58		0.58	0.58	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	197	482	398	289	486	360	297	1519		84	1466	
v/s Ratio Prot		0.11			c0.17			c0.56			0.29	
v/s Ratio Perm	0.07		0.02	0.07		0.11	0.11			0.31		
v/c Ratio	0.22	0.35	0.05	0.22	0.56	0.36	0.20	0.97		0.55	0.50	
Uniform Delay, d1	25.5	26.7	24.2	25.6	28.8	26.7	10.0	20.1		12.9	12.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.58		1.00	1.00	
Incremental Delay, d2	2.5	2.0	0.2	1.8	4.5	2.7	0.8	10.4		23.3	1.2	
Delay (s)	28.1	28.7	24.4	27.4	33.3	29.5	9.6	22.1		36.2	13.7	
Level of Service	C	C	C	C	C	C	A	C		D	B	
Approach Delay (s)		27.6			31.3			21.6			15.0	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1105: Ashland Ave. □ W 19th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	53	41	14	38	71	68	49	1354	13	29	695	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			0.95		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.97			0.98		0.96	1.00		1.00	1.00	
Frt		0.98			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1597			1534		1422	2695		1550	2562	
Flt Permitted		0.80			0.92		0.30	1.00		0.10	1.00	
Satd. Flow (perm)		1313			1427		451	2695		165	2562	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	58	45	15	42	78	75	54	1488	14	32	764	49
RTOR Reduction (vph)	0	5	0	0	22	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	113	0	0	173	0	54	1501	0	32	808	0
Confl. Peds. (#/hr)	73		75	75		73	40		59	59		40
Confl. Bikes (#/hr)			1			1			1			2
Heavy Vehicles (%)	4%	2%	0%	0%	1%	6%	8%	8%	0%	3%	9%	2%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.0			30.0		62.0	62.0		62.0	62.0	
Effective Green, g (s)		30.0			30.0		62.0	62.0		62.0	62.0	
Actuated g/C Ratio		0.30			0.30		0.62	0.62		0.62	0.62	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		393			428		279	1670		102	1588	
v/s Ratio Prot								c0.56			0.32	
v/s Ratio Perm		0.09			c0.12		0.12			0.19		
v/c Ratio		0.29			0.40		0.19	0.90		0.31	0.51	
Uniform Delay, d1		26.8			27.9		8.2	16.3		9.0	10.5	
Progression Factor		1.00			1.00		0.64	0.43		0.59	0.58	
Incremental Delay, d2		1.8			2.8		0.9	4.9		7.3	1.1	
Delay (s)		28.7			30.7		6.1	11.9		12.5	7.2	
Level of Service		C			C		A	B		B	A	
Approach Delay (s)		28.7			30.7			11.7			7.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↰↑ ↑↱		↰	↑ ↑↱	
Volume (vph)	44	172	7	93	129	30	3	1285	64	38	670	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99			0.99		1.00	0.99	
Flpb, ped/bikes		0.99			0.98			1.00		1.00	1.00	
Frt		1.00			0.98			0.99		1.00	0.99	
Flt Protected		0.99			0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1722			1612			2651		1550	2597	
Flt Permitted		0.88			0.70			0.95		0.11	1.00	
Satd. Flow (perm)		1528			1150			2530		183	2597	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	48	189	8	102	142	33	3	1412	70	42	736	30
RTOR Reduction (vph)	0	1	0	0	5	0	0	3	0	0	2	0
Lane Group Flow (vph)	0	244	0	0	272	0	0	1482	0	42	764	0
Confl. Peds. (#/hr)	49		88	88		49	43		32	32		43
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	7%	1%	0%	5%	3%	13%	0%	7%	3%	3%	12%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.6			27.6			64.4		64.4	64.4	
Effective Green, g (s)		27.6			27.6			64.4		64.4	64.4	
Actuated g/C Ratio		0.28			0.28			0.64		0.64	0.64	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		5.0			5.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		421			317			1629		117	1672	
v/s Ratio Prot											0.29	
v/s Ratio Perm		0.16			c0.24			c0.59		0.23		
v/c Ratio		0.58			0.86			0.91		0.36	0.46	
Uniform Delay, d1		31.2			34.3			15.3		8.2	9.0	
Progression Factor		1.00			1.00			1.00		0.59	0.65	
Incremental Delay, d2		3.1			21.5			9.1		7.6	0.8	
Delay (s)		34.2			55.9			24.4		12.5	6.6	
Level of Service		C			E			C		B	A	
Approach Delay (s)		34.2			55.9			24.4			6.9	
Approach LOS		C			E			C			A	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. Ashland Ave. W Cermak Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL
Lane Configurations	↰	↑↱			↰	↑↱			↰	↑↑	↱	↰
Volume (vph)	74	278	51	91	93	298	104	29	101	1104	153	42
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	10	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0			4.0	4.0	4.0	3.0
Lane Util. Factor	1.00	0.95			1.00	0.95			1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00	0.93			1.00	1.00	0.99	1.00
Flpb, ped/bikes	0.86	1.00			1.00	1.00			0.99	1.00	1.00	1.00
Frt	1.00	0.98			1.00	0.96			1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00			0.95	1.00			0.95	1.00	1.00	0.95
Satd. Flow (prot)	1222	3080			1341	2716			1442	2386	700	1215
Flt Permitted	0.50	1.00			0.26	1.00			0.28	1.00	1.00	0.08
Satd. Flow (perm)	638	3080			373	2716			432	2386	700	99
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	81	305	56	100	102	327	114	32	111	1213	168	46
RTOR Reduction (vph)	0	0	0	0	0	27	0	0	0	0	50	0
Lane Group Flow (vph)	81	361	0	0	202	414	0	0	143	1213	118	46
Confl. Peds. (#/hr)	155						155		50			
Confl. Bikes (#/hr)							5				1	
Heavy Vehicles (%)	12%	5%	4%	16%	22%	8%	11%	14%	9%	6%	7%	36%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	8	0
Parking (#/hr)										74	74	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm
Protected Phases		4		3	3	8		5	5	2		
Permitted Phases	4			8	8			2	2		2	6
Actuated Green, G (s)	20.5	20.5			36.5	36.5			59.5	59.5	59.5	51.5
Effective Green, g (s)	20.5	20.5			36.5	36.5			59.5	59.5	59.5	51.5
Actuated g/C Ratio	0.16	0.16			0.28	0.28			0.46	0.46	0.46	0.40
Clearance Time (s)	4.0	4.0			3.0	4.0			4.0	4.0	4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	100	485			201	762			236	1092	320	39
v/s Ratio Prot		0.12			c0.10	0.15			0.02	c0.51		
v/s Ratio Perm	0.13				c0.18				0.25		0.17	c0.46
v/c Ratio	0.81	0.74			1.00	0.54			0.61	1.11	0.37	1.18
Uniform Delay, d1	52.9	52.2			43.0	39.7			37.4	35.2	23.0	39.2
Progression Factor	1.00	1.00			1.00	1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2	37.2	6.1			64.8	0.8			4.3	63.0	3.3	202.0
Delay (s)	90.1	58.4			107.8	40.5			41.8	98.2	26.3	241.3
Level of Service	F	E			F	D			D	F	C	F
Approach Delay (s)		64.2				61.6				85.0		
Approach LOS		E				E				F		

Intersection Summary			
HCM 2000 Control Delay	68.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	SBT	SBR	SBR2	NEL	NER	NER2
Lane Configurations	↑↑	↱		↰	↱	
Volume (vph)	601	135	32	196	192	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	12	11	12	12
Total Lost time (s)	3.0	3.0		4.0	4.0	
Lane Util. Factor	0.95	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.84		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85	
Flt Protected	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	2862	876		1401	1327	
Flt Permitted	1.00	1.00		0.95	1.00	
Satd. Flow (perm)	2862	876		1401	1327	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	660	148	35	215	211	38
RTOR Reduction (vph)	0	61	0	0	76	0
Lane Group Flow (vph)	660	122	0	215	173	0
Confl. Peds. (#/hr)		50				
Confl. Bikes (#/hr)		3				
Heavy Vehicles (%)	8%	22%	12%	18%	15%	17%
Bus Blockages (#/hr)	0	8	0	0	0	0
Parking (#/hr)	6	6				
Turn Type	NA	Perm		NA	Perm	
Protected Phases	6			9		
Permitted Phases		6			9	
Actuated Green, G (s)	51.5	51.5		22.0	22.0	
Effective Green, g (s)	51.5	51.5		22.0	22.0	
Actuated g/C Ratio	0.40	0.40		0.17	0.17	
Clearance Time (s)	3.0	3.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1133	347		237	224	
v/s Ratio Prot	0.23			c0.15		
v/s Ratio Perm		0.14			0.13	
v/c Ratio	0.58	0.35		0.91	0.77	
Uniform Delay, d1	30.8	27.5		53.0	51.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.6		34.3	15.0	
Delay (s)	31.6	28.2		87.3	66.6	
Level of Service	C	C		F	E	
Approach Delay (s)	41.7			76.2		
Approach LOS	D			E		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1110: Ashland Ave. □ 2451 S Ashland Ave.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	2	0	3	2	0	0	6	1464	0	4	695	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.97			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			0.97		1.00	1.00		1.00	1.00	
Frt		0.92			1.00		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1570			828		1413	3033		1322	3178	
Flt Permitted		1.00			1.00		0.36	1.00		0.15	1.00	
Satd. Flow (perm)		1601			872		537	3033		202	3178	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	2	0	3	2	0	0	7	1609	0	4	764	2
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2	0	7	1609	0	4	766	0
Confl. Peds. (#/hr)	1		2	2		1	1		2	2		1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	100%	0%	0%	17%	9%	0%	25%	4%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.9			1.9		88.1	88.1		88.1	88.1	
Effective Green, g (s)		1.9			1.9		88.1	88.1		88.1	88.1	
Actuated g/C Ratio		0.02			0.02		0.88	0.88		0.88	0.88	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		30			16		473	2672		177	2799	
v/s Ratio Prot								c0.53			0.24	
v/s Ratio Perm		0.00			c0.00		0.01			0.02		
v/c Ratio		0.00			0.12		0.01	0.60		0.02	0.27	
Uniform Delay, d1		48.1			48.2		0.7	1.5		0.7	0.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			7.3		0.1	1.0		0.2	0.2	
Delay (s)		48.2			55.5		0.8	2.5		1.0	1.2	
Level of Service		D			E		A	A		A	A	
Approach Delay (s)		48.2			55.5			2.5			1.2	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1111: Ashland Ave. □ W 27th St.

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑↑	↑↑	↱
Volume (vph)	1	1	2	1502	797	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	3.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1710	765	1140	3226	3109	
Flt Permitted	0.95	1.00	0.31	1.00	1.00	
Satd. Flow (perm)	1710	765	374	3226	3109	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	1	2	1651	876	0
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	1	0	2	1651	876	0
Confl. Peds. (#/hr)			2			2
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	100%	50%	6%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	1.3	1.3	79.7	79.7	75.6	
Effective Green, g (s)	1.3	1.3	79.7	79.7	75.6	
Actuated g/C Ratio	0.01	0.01	0.89	0.89	0.84	
Clearance Time (s)	4.0	4.0	3.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	24	11	340	2856	2611	
v/s Ratio Prot	c0.00		0.00	c0.51	0.28	
v/s Ratio Perm		0.00	0.01			
v/c Ratio	0.04	0.00	0.01	0.58	0.34	
Uniform Delay, d1	43.7	43.7	0.6	1.2	1.6	
Progression Factor	1.00	1.00	1.05	0.67	1.00	
Incremental Delay, d2	0.7	0.0	0.0	0.6	0.3	
Delay (s)	44.5	43.8	0.7	1.5	2.0	
Level of Service	D	D	A	A	A	
Approach Delay (s)	44.1			1.5	2.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	1.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1112: Ashland Ave. □ W Marketplace Access Rd.

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑↑	↑↱	
Volume (vph)	31	17	24	1446	709	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0	3.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1062	1024	1281	2702	2603	
Flt Permitted	0.95	1.00	0.33	1.00	1.00	
Satd. Flow (perm)	1062	1024	442	2702	2603	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	34	19	26	1589	779	24
RTOR Reduction (vph)	0	18	0	0	1	0
Lane Group Flow (vph)	34	1	26	1589	802	0
Confl. Peds. (#/hr)		1	3			3
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	61%	47%	29%	4%	7%	41%
Parking (#/hr)				40	38	
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	6.1	6.1	74.9	74.9	69.4	
Effective Green, g (s)	6.1	6.1	74.9	74.9	69.4	
Actuated g/C Ratio	0.07	0.07	0.83	0.83	0.77	
Clearance Time (s)	4.0	4.0	3.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	71	69	391	2248	2007	
v/s Ratio Prot	c0.03		0.00	c0.59	0.31	
v/s Ratio Perm		0.00	0.05			
v/c Ratio	0.48	0.02	0.07	0.71	0.40	
Uniform Delay, d1	40.4	39.2	1.4	3.1	3.4	
Progression Factor	1.00	1.00	1.00	1.00	0.76	
Incremental Delay, d2	5.0	0.1	0.1	1.9	0.6	
Delay (s)	45.4	39.3	1.5	5.0	3.2	
Level of Service	D	D	A	A	A	
Approach Delay (s)	43.2			4.9	3.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1113: Ashland Ave. □ W 31st Pl.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		✥			↑↑↱		↰	↑↑	↱
Volume (vph)	389	4	187	26	0	16	0	1010	33	11	566	227
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0			12.0		12.0	12.0	12.0
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00			1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00			1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85		0.95			1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1525	1531	1222		1179			3097		896	3090	1352
Flt Permitted	0.95	0.95	1.00		0.97			1.00		0.19	1.00	1.00
Satd. Flow (perm)	1525	1531	1222		1179			3097		178	3090	1352
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	427	4	205	29	0	18	0	1110	36	12	622	249
RTOR Reduction (vph)	0	0	155	0	45	0	0	2	0	0	0	116
Lane Group Flow (vph)	213	218	50	0	2	0	0	1144	0	12	622	133
Confl. Peds. (#/hr)							1		47	47		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	0%	21%	27%	0%	62%	0%	5%	33%	82%	7%	7%
Turn Type	Split	NA	Perm	Split	NA			NA		Perm	NA	Perm
Protected Phases	4	4		8	8			2			6	
Permitted Phases			4							6		6
Actuated Green, G (s)	27.0	27.0	27.0		4.4			58.6		58.6	58.6	58.6
Effective Green, g (s)	27.0	27.0	27.0		4.4			58.6		58.6	58.6	58.6
Actuated g/C Ratio	0.25	0.25	0.25		0.04			0.53		0.53	0.53	0.53
Clearance Time (s)	4.0	4.0	4.0		4.0			12.0		12.0	12.0	12.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	374	375	299		47			1649		94	1646	720
v/s Ratio Prot	0.14	c0.14			c0.00			c0.37			0.20	
v/s Ratio Perm			0.04							0.07		0.10
v/c Ratio	0.57	0.58	0.17		0.04			0.69		0.13	0.38	0.18
Uniform Delay, d1	36.4	36.5	32.7		50.8			19.1		12.9	15.0	13.3
Progression Factor	1.00	1.00	1.00		1.00			0.43		1.00	1.00	1.00
Incremental Delay, d2	6.2	6.4	1.2		0.4			1.5		2.8	0.7	0.6
Delay (s)	42.6	43.0	33.9		51.1			9.7		15.7	15.7	13.9
Level of Service	D	D	C		D			A		B	B	B
Approach Delay (s)		39.9			51.1			9.7			15.2	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. □ S Archer Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↑↑	↱	↰	↑↑	↱
Volume (vph)	173	1002	24	78	626	77	1	804	218	134	484	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	12
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0	3.0	3.0	5.0	3.0
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1604	4630		1558	4328			2932	1178	1544	2926	1137
Flt Permitted	0.23	1.00		0.16	1.00			0.95	1.00	0.17	1.00	1.00
Satd. Flow (perm)	385	4630		258	4328			2799	1178	279	2926	1137
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	190	1101	26	86	688	85	1	884	240	147	532	99
RTOR Reduction (vph)	0	2	0	0	14	0	0	0	44	0	0	20
Lane Group Flow (vph)	190	1125	0	86	759	0	0	885	196	147	532	79
Confl. Peds. (#/hr)	5		32	32		5	19		27	27		19
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	3%	2%	8%	6%	4%	4%	100%	7%	6%	7%	13%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8			2	3	1	6	7
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	47.0	38.0		39.0	33.0			43.0	49.0	53.0	53.0	64.0
Effective Green, g (s)	47.0	38.0		39.0	33.0			43.0	49.0	53.0	53.0	64.0
Actuated g/C Ratio	0.43	0.35		0.35	0.30			0.39	0.45	0.48	0.48	0.58
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	5.0
Lane Grp Cap (vph)	286	1599		162	1298			1094	524	214	1409	661
v/s Ratio Prot	c0.07	c0.24		0.03	0.18				0.02	c0.04	0.18	0.01
v/s Ratio Perm	0.22			0.16				c0.32	0.15	0.29		0.06
v/c Ratio	0.66	0.70		0.53	0.58			0.81	0.37	0.69	0.38	0.12
Uniform Delay, d1	21.5	31.1		25.0	32.7			29.8	20.3	19.2	18.1	10.3
Progression Factor	1.00	1.00		1.00	1.00			0.68	0.41	1.39	0.63	0.21
Incremental Delay, d2	7.5	1.4		3.3	1.9			6.0	0.4	8.3	0.7	0.2
Delay (s)	29.0	32.6		28.3	34.6			26.4	8.8	35.1	12.0	2.3
Level of Service	C	C		C	C			C	A	D	B	A
Approach Delay (s)		32.0			34.0			22.6			15.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1115: Ashland Ave. □ W Robinson St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑↱		↰	↑↱	
Volume (vph)	0	0	0	22	19	9	170	975	23	29	530	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	12	12	12	12
Total Lost time (s)					4.0	4.0	3.0	4.0		3.0	4.0	
Lane Util. Factor					1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes					1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes					0.99	1.00	0.99	1.00		1.00	1.00	
Frt					1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected					0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1593	1505	1264	3078		1708	3020	
Flt Permitted					0.97	1.00	0.41	1.00		0.25	1.00	
Satd. Flow (perm)					1593	1505	543	3078		458	3020	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	24	21	10	187	1071	25	32	582	5
RTOR Reduction (vph)	0	0	0	0	0	9	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	45	1	187	1095	0	32	587	0
Confl. Peds. (#/hr)	1		5	5		1	17		6	6		17
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	11%	0%	30%	7%	4%	0%	13%	20%
Turn Type				Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)					7.4	7.4	94.6	88.0		87.0	83.4	
Effective Green, g (s)					7.4	7.4	94.6	88.0		87.0	83.4	
Actuated g/C Ratio					0.07	0.07	0.86	0.80		0.79	0.76	
Clearance Time (s)					4.0	4.0	3.0	4.0		3.0	4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)					107	101	520	2462		403	2289	
v/s Ratio Prot							c0.03	c0.36		0.00	0.19	
v/s Ratio Perm					0.03	0.00	0.28			0.06		
v/c Ratio					0.42	0.01	0.36	0.44		0.08	0.26	
Uniform Delay, d1					49.2	47.9	1.4	3.4		2.5	4.0	
Progression Factor					1.00	1.00	0.80	0.68		0.60	0.61	
Incremental Delay, d2					2.7	0.0	0.4	0.6		0.1	0.3	
Delay (s)					51.9	47.9	1.5	2.9		1.6	2.7	
Level of Service					D	D	A	A		A	A	
Approach Delay (s)		0.0			51.2			2.7			2.6	
Approach LOS		A			D			A			A	

Intersection Summary

HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1118: Ashland Ave. □ W 33rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✣			↑↱		↰	↑↑	
Volume (vph)	44	27	28	11	0	26	1	714	5	7	485	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)	4.0	4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			0.99			1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	0.92			0.90			1.00		1.00	1.00	
Flt Protected	0.95	1.00			0.99			1.00		0.95	1.00	
Satd. Flow (prot)	1674	1649			1399			2434		1395	2726	
Flt Permitted	0.78	1.00			0.94			0.95		0.31	1.00	
Satd. Flow (perm)	1379	1649			1335			2324		461	2726	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	48	30	31	12	0	29	1	785	5	8	533	0
RTOR Reduction (vph)	0	22	0	0	21	0	0	0	0	0	0	0
Lane Group Flow (vph)	48	39	0	0	20	0	0	791	0	8	533	0
Confl. Peds. (#/hr)	1		3	3		1	3		3	3		3
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	2%	0%	0%	0%	0%	19%	0%	12%	0%	14%	14%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.0	31.0			31.0			71.0		71.0	71.0	
Effective Green, g (s)	31.0	31.0			31.0			71.0		71.0	71.0	
Actuated g/C Ratio	0.28	0.28			0.28			0.65		0.65	0.65	
Clearance Time (s)	4.0	4.0			4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	388	464			376			1500		297	1759	
v/s Ratio Prot		0.02									0.20	
v/s Ratio Perm	c0.03				0.02			c0.34		0.02		
v/c Ratio	0.12	0.08			0.05			0.53		0.03	0.30	
Uniform Delay, d1	29.4	29.1			28.8			10.5		7.0	8.6	
Progression Factor	1.00	1.00			1.00			0.17		0.40	0.45	
Incremental Delay, d2	0.7	0.4			0.3			1.1		0.2	0.4	
Delay (s)	30.0	29.4			29.1			2.9		3.0	4.3	
Level of Service	C	C			C			A		A	A	
Approach Delay (s)		29.7			29.1			2.9			4.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1121: Ashland Ave. □ W 35th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	47	171	50	33	132	91	38	779	37	113	435	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1559	1514	1230	1543	1348	1120	1413	2545	977	1437	2494	1003
Flt Permitted	0.60	1.00	1.00	0.56	1.00	1.00	0.48	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	986	1514	1230	913	1348	1120	712	2545	977	357	2494	1003
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	52	188	55	36	145	100	42	856	41	124	478	12
RTOR Reduction (vph)	0	0	31	0	2	63	0	0	20	0	0	5
Lane Group Flow (vph)	52	188	24	36	153	27	42	856	21	124	478	7
Confl. Peds. (#/hr)	3		4	4		3	10		8	8		10
Confl. Bikes (#/hr)						1			2			3
Heavy Vehicles (%)	2%	11%	14%	3%	17%	19%	16%	13%	3%	15%	14%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	60.6	56.2	56.2	68.0	60.6	60.6
Effective Green, g (s)	33.0	33.0	33.0	33.0	33.0	33.0	60.6	56.2	56.2	68.0	60.6	60.6
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.55	0.51	0.51	0.62	0.55	0.55
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	295	454	369	273	404	336	420	1300	499	307	1373	552
v/s Ratio Prot		c0.12			0.11		0.00	c0.34		c0.03	0.19	
v/s Ratio Perm	0.05		0.02	0.04		0.02	0.05		0.02	0.22		0.01
v/c Ratio	0.18	0.41	0.07	0.13	0.38	0.08	0.10	0.66	0.04	0.40	0.35	0.01
Uniform Delay, d1	28.5	30.8	27.5	28.1	30.4	27.6	11.4	19.8	13.4	10.5	13.7	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.24	1.24	1.00
Incremental Delay, d2	1.3	2.8	0.3	1.0	2.7	0.5	0.1	2.6	0.2	0.9	0.7	0.0
Delay (s)	29.8	33.5	27.8	29.1	33.1	28.1	11.5	22.5	13.6	13.9	17.7	11.2
Level of Service	C	C	C	C	C	C	B	C	B	B	B	B
Approach Delay (s)		31.8			31.0			21.6			16.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1123: Ashland Ave. □ W 37th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	33	13	32	10	2	17	36	1061	20	29	516	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		4.0			4.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		0.99	1.00		1.00	1.00	
Frt		0.94			0.92		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1637			1121		1426	2846		1286	2820	
Flt Permitted		0.86			0.90		0.43	1.00		0.22	1.00	
Satd. Flow (perm)		1430			1031		645	2846		295	2820	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	36	14	35	11	2	19	40	1166	22	32	567	22
RTOR Reduction (vph)	0	31	0	0	17	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	54	0	0	15	0	40	1187	0	32	587	0
Confl. Peds. (#/hr)	10		2	2		10	7		2	2		7
Heavy Vehicles (%)	0%	0%	0%	20%	0%	59%	11%	10%	10%	24%	11%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.1			9.1		56.9	56.9		56.9	56.9	
Effective Green, g (s)		9.1			9.1		56.9	56.9		56.9	56.9	
Actuated g/C Ratio		0.12			0.12		0.76	0.76		0.76	0.76	
Clearance Time (s)		4.0			4.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		173			125		489	2159		223	2139	
v/s Ratio Prot								c0.42			0.21	
v/s Ratio Perm		c0.04			0.01		0.06			0.11		
v/c Ratio		0.31			0.12		0.08	0.55		0.14	0.27	
Uniform Delay, d1		30.1			29.4		2.3	3.7		2.5	2.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.2			0.9		0.3	1.0		1.3	0.3	
Delay (s)		32.3			30.3		2.7	4.8		3.8	3.1	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		32.3			30.3			4.7			3.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1127: Ashland Ave. □ W Pershing Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑	↱	↰	↑	↱
Volume (vph)	20	265	111	107	253	112	92	101	132	81	78	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	12	12	11	12	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1437	2952	1345	1322	2802	992	1676	1246	1139	1413	1266	1184
Flt Permitted	0.58	1.00	1.00	0.51	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	879	2952	1345	707	2802	992	1676	1246	1139	1413	1266	1184
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	291	122	118	278	123	101	111	145	89	86	24
RTOR Reduction (vph)	0	0	70	0	0	63	0	0	113	0	0	21
Lane Group Flow (vph)	22	291	52	118	278	60	101	111	32	89	86	3
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	15%	12%	10%	25%	18%	46%	2%	30%	17%	17%	28%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.3	36.5	36.5	47.5	41.7	41.7	18.6	18.6	18.6	9.9	9.9	9.9
Effective Green, g (s)	39.3	36.5	36.5	47.5	41.7	41.7	18.6	18.6	18.6	9.9	9.9	9.9
Actuated g/C Ratio	0.46	0.43	0.43	0.56	0.49	0.49	0.22	0.22	0.22	0.12	0.12	0.12
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	424	1267	577	452	1374	486	366	272	249	164	147	137
v/s Ratio Prot	0.00	0.10		c0.02	0.10		0.06	c0.09		0.06	c0.07	
v/s Ratio Perm	0.02		0.04	c0.12		0.06			0.03			0.00
v/c Ratio	0.05	0.23	0.09	0.26	0.20	0.12	0.28	0.41	0.13	0.54	0.59	0.02
Uniform Delay, d1	12.5	15.4	14.4	9.2	12.2	11.7	27.6	28.5	26.7	35.4	35.6	33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.4	0.3	0.3	0.3	0.5	1.9	4.5	1.1	3.6	5.8	0.1
Delay (s)	12.5	15.8	14.7	9.5	12.6	12.3	29.5	33.0	27.7	39.0	41.4	33.3
Level of Service	B	B	B	A	B	B	C	C	C	D	D	C
Approach Delay (s)		15.3			11.8			29.8			39.4	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1130: Ashland Ave. □ W 42nd St. (West)

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑↑	↑↑	↱
Volume (vph)	81	33	7	990	386	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	12	11	11	12
Total Lost time (s)	5.0		3.0	3.0	3.0	3.0
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1534		1706	2698	3061	1345
Flt Permitted	0.97		0.46	1.00	1.00	1.00
Satd. Flow (perm)	1534		820	2698	3061	1345
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	89	36	8	1088	424	34
RTOR Reduction (vph)	17	0	0	0	0	12
Lane Group Flow (vph)	108	0	8	1088	424	22
Confl. Peds. (#/hr)	2	1	4			4
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	12%	0%	6%	8%	10%
Parking (#/hr)				34		
Turn Type	NA		custom	NA	NA	Perm
Protected Phases	4		5 9	2 9	6	
Permitted Phases			2			6
Actuated Green, G (s)	17.0		70.0	73.0	58.8	58.8
Effective Green, g (s)	17.0		70.0	73.0	58.8	58.8
Actuated g/C Ratio	0.17		0.70	0.73	0.59	0.59
Clearance Time (s)	5.0				3.0	3.0
Vehicle Extension (s)	8.0				3.0	3.0
Lane Grp Cap (vph)	260		646	1969	1799	790
v/s Ratio Prot	c0.07		0.00	c0.40	0.14	
v/s Ratio Perm			0.01			0.02
v/c Ratio	0.41		0.01	0.55	0.24	0.03
Uniform Delay, d1	37.1		4.7	6.1	9.9	8.6
Progression Factor	1.00		0.01	0.00	1.00	1.00
Incremental Delay, d2	4.5		0.0	0.2	0.3	0.1
Delay (s)	41.6		0.0	0.3	10.2	8.7
Level of Service	D		A	A	B	A
Approach Delay (s)	41.6			0.3	10.1	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1131: Ashland Ave. □ W 42nd Pl.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↰↱		↰	↑↱	
Volume (vph)	7	0	5	2	0	2	3	1131	0	6	649	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	12	11	11	11	11	12
Total Lost time (s)		5.0			5.0			3.0		5.0	3.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		0.95			0.93			1.00		1.00	1.00	
Flt Protected		0.97			0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1656			1092			2963		990	2825	
Flt Permitted		0.89			0.93			0.95		0.17	1.00	
Satd. Flow (perm)		1519			1041			2827		178	2825	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	8	0	5	2	0	2	3	1243	0	7	713	3
RTOR Reduction (vph)	0	11	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	1	0	0	1246	0	7	716	0
Confl. Peds. (#/hr)							13		5	5		13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	50%	0%	50%	0%	6%	0%	67%	11%	33%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		custom	NA	
Protected Phases		4			8			2		13	6 13	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.0			17.0			63.0		65.8	68.8	
Effective Green, g (s)		17.0			17.0			63.0		65.8	68.8	
Actuated g/C Ratio		0.17			0.17			0.63		0.66	0.69	
Clearance Time (s)		5.0			5.0			3.0		5.0		
Vehicle Extension (s)		8.0			8.0			3.0		3.0		
Lane Grp Cap (vph)		258			176			1781		173	1943	
v/s Ratio Prot										0.00	c0.25	
v/s Ratio Perm		c0.00			0.00			c0.44		0.02		
v/c Ratio		0.01			0.00			0.70		0.04	0.37	
Uniform Delay, d1		34.5			34.5			12.2		12.0	6.5	
Progression Factor		1.00			1.00			0.47		0.48	0.50	
Incremental Delay, d2		0.1			0.0			2.2		0.1	0.1	
Delay (s)		34.6			34.5			8.0		5.8	3.4	
Level of Service		C			C			A		A	A	
Approach Delay (s)		34.6			34.5			8.0			3.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1132: Ashland Ave. □ W 43rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	106	124	28	23	75	66	62	721	60	63	343	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1518	1449		1446	1461	1258	1594	2797	948	1355	2648	861
Flt Permitted	0.70	1.00		0.59	1.00	1.00	0.51	1.00	1.00	0.28	1.00	1.00
Satd. Flow (perm)	1125	1449		901	1461	1258	863	2797	948	403	2648	861
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	116	136	31	25	82	73	68	792	66	69	377	80
RTOR Reduction (vph)	0	8	0	0	0	53	0	0	26	0	0	37
Lane Group Flow (vph)	116	159	0	25	82	20	68	792	40	69	377	43
Confl. Peds. (#/hr)	1		14	14		1	8		1	1		8
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	5%	14%	4%	9%	15%	12%	3%	4%	12%	22%	8%	16%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	27.0	27.0		27.0	27.0	27.0	60.6	53.1	53.1	61.4	53.5	53.5
Effective Green, g (s)	27.0	27.0		27.0	27.0	27.0	60.6	53.1	53.1	61.4	53.5	53.5
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.61	0.53	0.53	0.61	0.54	0.54
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0
Lane Grp Cap (vph)	303	391		243	394	339	577	1485	503	322	1416	460
v/s Ratio Prot		c0.11			0.06		0.01	c0.28		c0.02	0.14	
v/s Ratio Perm	0.10			0.03		0.02	0.06		0.04	0.11		0.05
v/c Ratio	0.38	0.41		0.10	0.21	0.06	0.12	0.53	0.08	0.21	0.27	0.09
Uniform Delay, d1	29.7	29.9		27.4	28.2	27.1	8.1	15.3	11.5	8.5	12.6	11.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.46	0.88	0.80	0.76	0.60	0.25
Incremental Delay, d2	3.6	3.1		0.8	1.2	0.3	0.2	1.2	0.3	0.7	0.4	0.4
Delay (s)	33.4	33.0		28.3	29.4	27.4	3.9	14.8	9.5	7.1	8.0	3.3
Level of Service	C	C		C	C	C	A	B	A	A	A	A
Approach Delay (s)		33.2			28.4			13.6			7.2	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	31	9	15	21	5	9	14	962	37	40	532	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	11	10	11	11
Total Lost time (s)		5.0			5.0		4.0	4.0		3.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.97			1.00		0.99	1.00		1.00	1.00	
Frt		0.96			0.96		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1602			1441		1383	2848		1451	2524	
Flt Permitted		0.80			0.83		0.42	1.00		0.22	1.00	
Satd. Flow (perm)		1323			1239		612	2848		342	2524	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	34	10	16	23	5	10	15	1057	41	44	585	27
RTOR Reduction (vph)	0	15	0	0	9	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	45	0	0	29	0	15	1097	0	44	610	0
Confl. Peds. (#/hr)	16		2	2		16	9		2	2		9
Heavy Vehicles (%)	0%	0%	7%	5%	0%	44%	14%	5%	3%	10%	10%	4%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.1			9.1		75.0	75.0		81.9	81.9	
Effective Green, g (s)		9.1			9.1		75.0	75.0		81.9	81.9	
Actuated g/C Ratio		0.09			0.09		0.75	0.75		0.82	0.82	
Clearance Time (s)		5.0			5.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		120			112		459	2136		323	2067	
v/s Ratio Prot								c0.39		0.01	c0.24	
v/s Ratio Perm		c0.03			0.02		0.02			0.11		
v/c Ratio		0.38			0.26		0.03	0.51		0.14	0.30	
Uniform Delay, d1		42.8			42.3		3.2	5.1		2.3	2.2	
Progression Factor		1.00			1.00		0.28	0.20		1.58	2.25	
Incremental Delay, d2		4.1			2.6		0.1	0.8		0.2	0.4	
Delay (s)		46.9			44.9		1.0	1.8		3.9	5.2	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		46.9			44.9			1.8			5.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1134: Ashland Ave. □ W 45th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	35	9	15	15	8	22	10	790	28	19	383	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		0.98	1.00		1.00	1.00	
Frt		0.97			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1632			1556		1429	2632		1588	2515	
Flt Permitted		0.84			0.92		0.48	1.00		0.27	1.00	
Satd. Flow (perm)		1409			1458		721	2632		452	2515	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	38	10	16	16	9	24	11	868	31	21	421	29
RTOR Reduction (vph)	0	12	0	0	17	0	0	3	0	0	5	0
Lane Group Flow (vph)	0	52	0	0	32	0	11	896	0	21	445	0
Confl. Peds. (#/hr)	15		10	10		15	9		7	7		9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	0%	0%	7%	13%	0%	0%	10%	6%	7%	0%	11%	0%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0		63.0	63.0		63.0	63.0	
Effective Green, g (s)		28.0			28.0		63.0	63.0		63.0	63.0	
Actuated g/C Ratio		0.28			0.28		0.63	0.63		0.63	0.63	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		394			408		454	1658		284	1584	
v/s Ratio Prot								c0.34			0.18	
v/s Ratio Perm		c0.04			0.02		0.02			0.05		
v/c Ratio		0.13			0.08		0.02	0.54		0.07	0.28	
Uniform Delay, d1		26.9			26.5		7.0	10.4		7.2	8.3	
Progression Factor		1.00			1.00		1.09	1.17		0.55	0.80	
Incremental Delay, d2		0.7			0.4		0.1	1.1		0.5	0.4	
Delay (s)		27.6			26.9		7.7	13.3		4.4	7.1	
Level of Service		C			C		A	B		A	A	
Approach Delay (s)		27.6			26.9			13.2			7.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1135: Ashland Ave. □ W 46th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	31	17	10	4	9	38	13	761	15	48	340	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		0.97	1.00		0.98	1.00	
Frt		0.98			0.90		1.00	1.00		1.00	0.99	
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1662			1517		1556	2654		1541	2405	
Flt Permitted		0.86			0.99		0.51	1.00		0.29	1.00	
Satd. Flow (perm)		1470			1505		832	2654		471	2405	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	34	19	11	4	10	42	14	836	16	53	374	29
RTOR Reduction (vph)	0	7	0	0	30	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	57	0	0	26	0	14	851	0	53	397	0
Confl. Peds. (#/hr)	13		5	5		13	11		18	18		11
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	10%	0%	0%	5%	0%	6%	7%	2%	13%	4%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Effective Green, g (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Actuated g/C Ratio		0.28			0.28		0.64	0.64		0.64	0.64	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		411			421		532	1698		301	1539	
v/s Ratio Prot								c0.32			0.17	
v/s Ratio Perm		c0.04			0.02		0.02			0.11		
v/c Ratio		0.14			0.06		0.03	0.50		0.18	0.26	
Uniform Delay, d1		27.0			26.4		6.6	9.5		7.3	7.8	
Progression Factor		1.00			1.00		0.94	0.91		1.88	1.71	
Incremental Delay, d2		0.7			0.3		0.1	1.0		1.2	0.4	
Delay (s)		27.7			26.7		6.3	9.7		15.0	13.7	
Level of Service		C			C		A	A		B	B	
Approach Delay (s)		27.7			26.7			9.6			13.8	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR2	SBL	SBT
Lane Configurations	↰	↑↱		↰	↑↱			↰	↑↑	↱	↰	↑↑
Volume (vph)	99	251	40	59	226	48	7	47	544	88	56	238
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95	1.00	1.00	0.95
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.95	1.00	1.00	0.98	1.00
Frt	1.00	0.98		1.00	0.97			1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1412	2705		1504	2703			1510	2607	1409	1398	2804
Flt Permitted	0.53	1.00		0.55	1.00			0.58	1.00	1.00	0.35	1.00
Satd. Flow (perm)	783	2705		878	2703			927	2607	1409	522	2804
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	109	276	44	65	248	53	8	52	598	97	62	262
RTOR Reduction (vph)	0	12	0	0	2	0	0	0	0	53	0	0
Lane Group Flow (vph)	109	308	0	65	307	0	0	52	598	44	62	262
Confl. Peds. (#/hr)			27	27		51		44			33	
Heavy Vehicles (%)	13%	16%	8%	5%	13%	15%	0%	4%	4%	5%	16%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)									52			0
Turn Type	pm+pt	NA		pm+pt	NA			Perm	NA	Perm	Perm	NA
Protected Phases	7	4		3	8				2			6
Permitted Phases	4			8				2		2	6	
Actuated Green, G (s)	43.8	37.8		41.4	36.6			45.4	45.4	45.4	45.4	45.4
Effective Green, g (s)	43.8	37.8		41.4	36.6			45.4	45.4	45.4	45.4	45.4
Actuated g/C Ratio	0.44	0.38		0.41	0.37			0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	380	1022		393	989			420	1183	639	236	1273
v/s Ratio Prot	c0.02	c0.11		0.01	0.11				c0.23			0.09
v/s Ratio Perm	0.11			0.06				0.06		0.03	0.12	
v/c Ratio	0.29	0.30		0.17	0.31			0.12	0.51	0.07	0.26	0.21
Uniform Delay, d1	17.1	21.8		17.9	22.7			15.8	19.3	15.4	16.9	16.4
Progression Factor	1.00	1.00		1.00	1.00			1.06	0.98	1.61	1.38	1.41
Incremental Delay, d2	0.4	0.8		0.2	0.8			0.5	1.3	0.2	2.6	0.4
Delay (s)	17.6	22.6		18.1	23.5			17.3	20.3	24.9	26.0	23.5
Level of Service	B	C		B	C			B	C	C	C	C
Approach Delay (s)		21.3			22.6				20.7			25.5
Approach LOS		C			C				C			C

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR	SWR2
Lane Configurations	↱	↱
Volume (vph)	59	4
Ideal Flow (vphpl)	1800	1800
Lane Width	11	12
Total Lost time (s)	4.0	5.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	0.92	1.00
Flpb, ped/bikes	1.00	1.00
Frt	0.85	0.86
Flt Protected	1.00	1.00
Satd. Flow (prot)	1073	1557
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1073	1557
Peak-hour factor, PHF	0.91	0.91
Adj. Flow (vph)	65	4
RTOR Reduction (vph)	35	3
Lane Group Flow (vph)	30	1
Confl. Peds. (#/hr)	44	
Heavy Vehicles (%)	10%	0%
Bus Blockages (#/hr)	8	0
Parking (#/hr)	0	
Turn Type	Perm	custom
Protected Phases		
Permitted Phases	6	8
Actuated Green, G (s)	45.4	36.6
Effective Green, g (s)	45.4	36.6
Actuated g/C Ratio	0.45	0.37
Clearance Time (s)	4.0	5.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	487	569
v/s Ratio Prot		
v/s Ratio Perm	0.03	0.00
v/c Ratio	0.06	0.00
Uniform Delay, d1	15.3	20.1
Progression Factor	2.16	1.00
Incremental Delay, d2	0.2	0.0
Delay (s)	33.4	20.1
Level of Service	C	C
Approach Delay (s)		
Approach LOS		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1137: Ashland Ave. □ W 48th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣		↰	↑↑			↑↱	
Volume (vph)	0	0	0	15	26	16	46	902	0	0	340	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	12	11	12
Total Lost time (s)					5.0		4.0	4.0			4.0	
Lane Util. Factor					1.00		1.00	0.95			0.95	
Frpb, ped/bikes					0.98		1.00	1.00			0.99	
Flpb, ped/bikes					0.98		0.96	1.00			1.00	
Frt					0.96		1.00	1.00			0.98	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					1542		1406	2734			2488	
Flt Permitted					0.99		0.50	1.00			1.00	
Satd. Flow (perm)					1542		743	2734			2488	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	16	29	18	51	991	0	0	374	45
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	49	0	51	991	0	0	410	0
Confl. Peds. (#/hr)	33		56	56		33	19		2	2		19
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	8%	12%	9%	4%	0%	0%	7%	5%
Parking (#/hr)								36			50	
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					24.0		67.0	67.0			67.0	
Effective Green, g (s)					24.0		67.0	67.0			67.0	
Actuated g/C Ratio					0.24		0.67	0.67			0.67	
Clearance Time (s)					5.0		4.0	4.0			4.0	
Lane Grp Cap (vph)					370		497	1831			1666	
v/s Ratio Prot								c0.36			0.16	
v/s Ratio Perm					0.03		0.07					
v/c Ratio					0.13		0.10	0.54			0.25	
Uniform Delay, d1					29.8		5.8	8.5			6.5	
Progression Factor					1.00		0.69	0.56			0.75	
Incremental Delay, d2					0.7		0.4	1.1			0.3	
Delay (s)					30.6		4.4	5.9			5.2	
Level of Service					C		A	A			A	
Approach Delay (s)		0.0			30.6			5.8			5.2	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	47	27	30	15	14	10	10	669	23	17	264	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00		0.99	1.00	
Frt		0.96			0.96		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1672			1652		1580	2630		1572	2486	
Flt Permitted		0.86			0.89		0.56	1.00		0.33	1.00	
Satd. Flow (perm)		1464			1504		937	2630		553	2486	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	52	30	33	16	15	11	11	735	25	19	290	20
RTOR Reduction (vph)	0	14	0	0	8	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	101	0	0	34	0	11	758	0	19	305	0
Confl. Peds. (#/hr)	5					5	4		14	14		4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	0%	0%	7%	0%	0%	0%	5%	0%	0%	9%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			24.0		67.0	67.0		67.0	67.0	
Effective Green, g (s)		24.0			24.0		67.0	67.0		67.0	67.0	
Actuated g/C Ratio		0.24			0.24		0.67	0.67		0.67	0.67	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		351			360		627	1762		370	1665	
v/s Ratio Prot								c0.29			0.12	
v/s Ratio Perm		c0.07			0.02		0.01			0.03		
v/c Ratio		0.29			0.09		0.02	0.43		0.05	0.18	
Uniform Delay, d1		31.0			29.5		5.5	7.6		5.6	6.2	
Progression Factor		1.00			1.00		0.63	0.47		0.19	0.15	
Incremental Delay, d2		2.0			0.5		0.0	0.7		0.3	0.2	
Delay (s)		33.1			30.1		3.5	4.3		1.3	1.2	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		33.1			30.1			4.3			1.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1139: Ashland Ave. □ W 50th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	26	15	8	17	15	26	5	705	6	22	289	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			0.99		0.98	1.00		0.99	1.00	
Frt		0.98			0.94		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1680			1622		1571	2617		1585	2795	
Flt Permitted		0.85			0.92		0.55	1.00		0.32	1.00	
Satd. Flow (perm)		1474			1523		913	2617		535	2795	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	29	16	9	19	16	29	5	775	7	24	318	13
RTOR Reduction (vph)	0	7	0	0	21	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	47	0	0	43	0	5	781	0	24	328	0
Confl. Peds. (#/hr)	19		26	26		19	8		8	8		8
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	12%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.0			26.0		65.0	65.0		65.0	65.0	
Effective Green, g (s)		26.0			26.0		65.0	65.0		65.0	65.0	
Actuated g/C Ratio		0.26			0.26		0.65	0.65		0.65	0.65	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		383			395		593	1701		347	1816	
v/s Ratio Prot								c0.30			0.12	
v/s Ratio Perm		c0.03			0.03		0.01			0.04		
v/c Ratio		0.12			0.11		0.01	0.46		0.07	0.18	
Uniform Delay, d1		28.3			28.2		6.2	8.7		6.4	6.9	
Progression Factor		1.00			1.00		0.81	0.67		0.67	0.64	
Incremental Delay, d2		0.7			0.5		0.0	0.9		0.4	0.2	
Delay (s)		29.0			28.7		5.0	6.7		4.7	4.7	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		29.0			28.7			6.7			4.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱	↱	↰	↑↑	↱
Volume (vph)	106	288	29	46	177	55	31	505	58	29	221	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1525	1541	1289	1519	1570	1306	1546	2568	848	1487	2372	834
Flt Permitted	0.58	1.00	1.00	0.42	1.00	1.00	0.60	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)	929	1541	1289	667	1570	1306	977	2568	848	617	2372	834
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	116	316	32	51	195	60	34	555	64	32	243	41
RTOR Reduction (vph)	0	0	18	0	0	40	0	1	25	0	0	18
Lane Group Flow (vph)	116	316	14	51	195	20	34	560	33	32	243	23
Confl. Peds. (#/hr)	5		12	12		5	4		14	14		4
Heavy Vehicles (%)	4%	9%	7%	4%	7%	7%	6%	4%	2%	10%	15%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	34.0	34.0	34.0	34.0	34.0	57.0	57.0	57.0	57.0	57.0	57.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0	57.0	57.0	57.0	57.0	57.0	57.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	315	523	438	226	533	444	556	1463	483	351	1352	475
v/s Ratio Prot		c0.21			0.12			c0.22			0.10	
v/s Ratio Perm	0.12		0.01	0.08		0.02	0.03		0.04	0.05		0.03
v/c Ratio	0.37	0.60	0.03	0.23	0.37	0.05	0.06	0.38	0.07	0.09	0.18	0.05
Uniform Delay, d1	24.9	27.4	22.0	23.6	24.9	22.1	9.6	11.8	9.6	9.8	10.3	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.06	1.71
Incremental Delay, d2	3.3	5.1	0.1	2.3	1.9	0.2	0.2	0.8	0.3	0.5	0.3	0.2
Delay (s)	28.2	32.5	22.1	25.9	26.8	22.3	9.8	12.6	9.9	10.9	11.3	16.5
Level of Service	C	C	C	C	C	C	A	B	A	B	B	B
Approach Delay (s)		30.7			25.8			12.2			11.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1142: Ashland Ave. □ W 53rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣		↰	↑↱		↰	↑↱	
Volume (vph)	0	0	0	9	5	13	10	659	0	6	250	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)					5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor					1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes					0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes					0.99		1.00	1.00		0.99	1.00	
Frt					0.93		1.00	1.00		1.00	0.99	
Flt Protected					0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1518		1444	2734		1346	2438	
Flt Permitted					0.98		0.57	1.00		0.34	1.00	
Satd. Flow (perm)					1518		874	2734		481	2438	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	10	5	14	11	724	0	7	275	14
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	19	0	11	724	0	7	285	0
Confl. Peds. (#/hr)	2		13	13		2	2		13	13		2
Heavy Vehicles (%)	0%	0%	0%	11%	0%	8%	10%	4%	0%	17%	11%	23%
Parking (#/hr)								36			48	
Turn Type				Perm	NA		Perm	NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases				8			2			6		
Actuated Green, G (s)					26.0		55.0	55.0		55.0	55.0	
Effective Green, g (s)					26.0		55.0	55.0		55.0	55.0	
Actuated g/C Ratio					0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)					5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)					438		534	1670		293	1489	
v/s Ratio Prot								c0.26			0.12	
v/s Ratio Perm					0.01		0.01			0.01		
v/c Ratio					0.04		0.02	0.43		0.02	0.19	
Uniform Delay, d1					23.0		6.9	9.3		6.9	7.7	
Progression Factor					1.00		0.17	0.12		1.00	1.00	
Incremental Delay, d2					0.2		0.1	0.8		0.2	0.3	
Delay (s)					23.2		1.2	1.9		7.1	8.0	
Level of Service					C		A	A		A	A	
Approach Delay (s)		0.0			23.2			1.9			8.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱	↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	138	656	29	121	614	0	0	241	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	9	11	11	10	10	10
Total Lost time (s)				5.0	5.0	5.0	5.0	3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.94	1.00	1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00	0.99	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1524	3069	1339	1472	2963			2437	937
Flt Permitted				0.95	1.00	1.00	0.57	1.00			1.00	1.00
Satd. Flow (perm)				1524	3069	1339	876	2963			2437	937
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	152	721	32	133	675	0	0	265	45
RTOR Reduction (vph)	0	0	0	0	0	20	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	152	721	12	133	675	0	0	265	19
Confl. Peds. (#/hr)	57					57	14		12	12		14
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	4%	6%	0%	0%	12%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm	custom	NA			NA	Perm
Protected Phases					8		5	2 5			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)				35.0	35.0	35.0	42.0	45.0			37.0	37.0
Effective Green, g (s)				35.0	35.0	35.0	42.0	45.0			37.0	37.0
Actuated g/C Ratio				0.39	0.39	0.39	0.47	0.50			0.41	0.41
Clearance Time (s)				5.0	5.0	5.0	5.0				3.0	3.0
Lane Grp Cap (vph)				592	1193	520	441	1481			1001	385
v/s Ratio Prot					c0.23		0.02	c0.23			0.11	
v/s Ratio Perm				0.10		0.01	0.12					0.02
v/c Ratio				0.26	0.60	0.02	0.30	0.46			0.26	0.05
Uniform Delay, d1				18.7	22.0	17.0	15.9	14.6			17.5	15.9
Progression Factor				1.00	1.00	1.00	0.24	0.23			1.16	6.62
Incremental Delay, d2				1.0	2.3	0.1	1.5	0.9			0.6	0.2
Delay (s)				19.7	24.2	17.0	5.4	4.3			20.9	105.7
Level of Service				B	C	B	A	A			C	F
Approach Delay (s)		0.0			23.2			4.5			33.2	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1145: Ashland Ave. □ W Garfield Blvd. (EB)

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱					↑↑	↱	↰	↑↑	
Volume (vph)	62	866	61	0	0	0	0	618	153	69	317	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	10	9	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00					0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.95					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1507	3011	1250					2745	1041	1479	2881	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.29	1.00	
Satd. Flow (perm)	1507	3011	1250					2745	1041	445	2881	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	68	952	67	0	0	0	0	679	168	76	348	0
RTOR Reduction (vph)	0	0	37	0	0	0	0	0	60	0	0	0
Lane Group Flow (vph)	68	952	30	0	0	0	0	679	108	76	348	0
Confl. Peds. (#/hr)	1		48	48		1	6		10	10		6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	6%	8%	0%	0%	0%	0%	6%	2%	4%	9%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm	custom	NA	
Protected Phases		4						2		1	1 6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	35.0	35.0	35.0					37.0	37.0	42.0	45.0	
Effective Green, g (s)	35.0	35.0	35.0					37.0	37.0	42.0	42.0	
Actuated g/C Ratio	0.39	0.39	0.39					0.41	0.41	0.47	0.47	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0	5.0		
Lane Grp Cap (vph)	586	1170	486					1128	427	265	1344	
v/s Ratio Prot		c0.32						c0.25		c0.02	0.12	
v/s Ratio Perm	0.05		0.02						0.10	0.12		
v/c Ratio	0.12	0.81	0.06					0.60	0.25	0.29	0.26	
Uniform Delay, d1	17.6	24.6	17.2					20.7	17.4	21.4	14.6	
Progression Factor	1.00	1.00	1.00					0.41	0.51	0.98	0.87	
Incremental Delay, d2	0.4	6.3	0.2					2.0	1.2	2.7	0.5	
Delay (s)	18.0	30.8	17.5					10.6	10.0	23.7	13.1	
Level of Service	B	C	B					B	B	C	B	
Approach Delay (s)		29.2			0.0			10.5			15.0	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1148: Ashland Ave. □ W 57th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✥						↑↱		↰	↑↑	
Volume (vph)	22	9	33	0	0	0	0	846	12	6	342	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	10	11	11
Total Lost time (s)		5.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		1.00	0.95	
Frpb, ped/bikes		0.98						1.00		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		0.93						1.00		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		1567						2693		1587	2541	
Flt Permitted		0.98						1.00		0.25	1.00	
Satd. Flow (perm)		1567						2693		416	2541	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	24	10	36	0	0	0	0	930	13	7	376	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	0	0	0	942	0	7	376	0
Confl. Peds. (#/hr)	7		17	17		7	23		10	10		23
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	4%	8%	0%	8%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		27.0						54.0		54.0	54.0	
Effective Green, g (s)		27.0						54.0		54.0	54.0	
Actuated g/C Ratio		0.30						0.60		0.60	0.60	
Clearance Time (s)		5.0						4.0		4.0	4.0	
Lane Grp Cap (vph)		470						1615		249	1524	
v/s Ratio Prot								c0.35			0.15	
v/s Ratio Perm		0.03								0.02		
v/c Ratio		0.10						0.58		0.03	0.25	
Uniform Delay, d1		22.7						11.1		7.3	8.5	
Progression Factor		1.00						0.81		0.78	1.15	
Incremental Delay, d2		0.4						1.3		0.2	0.4	
Delay (s)		23.1						10.3		5.9	10.1	
Level of Service		C						B		A	B	
Approach Delay (s)		23.1			0.0			10.3			10.0	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1150: Ashland Ave. □ W 59th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	75	280	38	46	209	36	90	682	48	29	311	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.88	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1432	1514	1202	1491	1585	1290	1501	2813	1077	1491	2881	1076
Flt Permitted	0.56	1.00	1.00	0.51	1.00	1.00	0.52	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	842	1514	1202	793	1585	1290	814	2813	1077	396	2881	1076
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	308	42	51	230	40	99	749	53	32	342	47
RTOR Reduction (vph)	0	0	24	0	0	23	0	0	32	0	0	28
Lane Group Flow (vph)	82	308	18	51	230	17	99	749	21	32	342	19
Confl. Peds. (#/hr)	7		63	63		7	25		1	1		25
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	11%	11%	5%	4%	6%	8%	2%	4%	0%	7%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	43.2	39.2	39.2	41.2	38.2	38.2	35.8	35.8	35.8	35.8	35.8	35.8
Effective Green, g (s)	43.2	39.2	39.2	41.2	38.2	38.2	35.8	35.8	35.8	35.8	35.8	35.8
Actuated g/C Ratio	0.48	0.44	0.44	0.46	0.42	0.42	0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	430	659	523	386	672	547	323	1118	428	157	1145	428
v/s Ratio Prot	c0.01	c0.20		0.00	0.15			c0.27			0.12	
v/s Ratio Perm	0.08		0.02	0.06		0.01	0.12		0.02	0.08		0.02
v/c Ratio	0.19	0.47	0.03	0.13	0.34	0.03	0.31	0.67	0.05	0.20	0.30	0.04
Uniform Delay, d1	13.0	18.0	14.6	13.8	17.4	15.1	18.6	22.2	16.6	17.8	18.5	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.36	0.38	0.25	1.44	1.25	3.15
Incremental Delay, d2	0.2	2.4	0.1	0.2	1.4	0.1	2.0	2.6	0.2	2.9	0.7	0.2
Delay (s)	13.2	20.4	14.7	14.0	18.8	15.2	8.7	10.9	4.4	28.4	23.9	52.5
Level of Service	B	C	B	B	B	B	A	B	A	C	C	D
Approach Delay (s)		18.5			17.6			10.3			27.4	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1152: Ashland Ave. □ W 61st St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↑↱		↰	↑↑	
Volume (vph)	26	25	80	0	0	0	0	852	40	6	395	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		1.00	0.95	
Frpb, ped/bikes		0.99						1.00		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		0.92						0.99		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		1813						2766		1401	2495	
Flt Permitted		0.99						1.00		0.23	1.00	
Satd. Flow (perm)		1813						2766		338	2495	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	29	27	88	0	0	0	0	936	44	7	434	0
RTOR Reduction (vph)	0	60	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	84	0	0	0	0	0	976	0	7	434	0
Confl. Peds. (#/hr)	6		7	7		6	24		16	16		24
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	3%	2%	17%	8%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		29.0						52.0		52.0	52.0	
Effective Green, g (s)		29.0						52.0		52.0	52.0	
Actuated g/C Ratio		0.32						0.58		0.58	0.58	
Clearance Time (s)		5.0						4.0		4.0	4.0	
Lane Grp Cap (vph)		584						1598		195	1441	
v/s Ratio Prot								c0.35			0.17	
v/s Ratio Perm		0.05								0.02		
v/c Ratio		0.14						0.61		0.04	0.30	
Uniform Delay, d1		21.7						12.4		8.2	9.7	
Progression Factor		1.00						0.35		1.13	1.03	
Incremental Delay, d2		0.5						1.5		0.3	0.5	
Delay (s)		22.2						5.9		9.6	10.6	
Level of Service		C						A		A	B	
Approach Delay (s)		22.2			0.0			5.9			10.5	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1154: Ashland Ave. □ W 63rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑	↱	↰	↑↱	
Volume (vph)	52	439	75	54	358	35	165	737	101	60	374	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0	5.0	3.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00		1.00	1.00	0.89	1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	0.97	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1495	1514	1207	1453	1581		1499	3020	1099	1557	2534	
Flt Permitted	0.31	1.00	1.00	0.25	1.00		0.43	1.00	1.00	0.26	1.00	
Satd. Flow (perm)	489	1514	1207	388	1581		677	3020	1099	428	2534	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	57	482	82	59	393	38	181	810	111	66	411	64
RTOR Reduction (vph)	0	0	39	0	4	0	0	0	41	0	14	0
Lane Group Flow (vph)	57	482	43	59	427	0	181	810	70	66	461	0
Confl. Peds. (#/hr)	19		76	76		19	37		42	42		37
Heavy Vehicles (%)	6%	11%	9%	7%	5%	0%	5%	4%	4%	2%	8%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								0	0		36	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0		45.0	40.0	40.0	43.0	39.0	
Effective Green, g (s)	33.0	33.0	33.0	33.0	33.0		45.0	40.0	40.0	43.0	39.0	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.50	0.44	0.44	0.48	0.43	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0	5.0	3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	179	555	442	142	579		384	1342	488	254	1098	
v/s Ratio Prot		c0.32			0.27		c0.03	c0.27		0.01	0.18	
v/s Ratio Perm	0.12		0.04	0.15			0.21		0.06	0.11		
v/c Ratio	0.32	0.87	0.10	0.42	0.74		0.47	0.60	0.14	0.26	0.42	
Uniform Delay, d1	20.4	26.5	18.7	21.3	24.7		13.5	19.0	14.8	13.4	17.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.39	1.25	1.91	2.20	1.93	
Incremental Delay, d2	4.6	16.7	0.4	8.7	8.2		0.8	1.9	0.6	0.5	1.2	
Delay (s)	25.1	43.2	19.2	30.0	32.9		19.7	25.6	28.9	30.0	35.2	
Level of Service	C	D	B	C	C		B	C	C	C	D	
Approach Delay (s)		38.4			32.6			24.9			34.5	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1156: Ashland Ave. □ W 65th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↑			↑↱	
Volume (vph)	0	0	0	35	7	49	14	1032	0	0	468	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	10	11	11	11	11	11
Total Lost time (s)					5.0		4.0	4.0			4.0	
Lane Util. Factor					1.00		1.00	0.95			0.95	
Frpb, ped/bikes					0.98		1.00	1.00			0.99	
Flpb, ped/bikes					0.97		0.96	1.00			1.00	
Frt					0.93		1.00	1.00			0.99	
Flt Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					1720		1529	2940			2596	
Flt Permitted					0.98		0.45	1.00			1.00	
Satd. Flow (perm)					1720		718	2940			2596	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	38	8	54	15	1134	0	0	514	36
RTOR Reduction (vph)	0	0	0	0	49	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	51	0	15	1134	0	0	547	0
Confl. Peds. (#/hr)	6		22	22		6	26		27	27		26
Heavy Vehicles (%)	0%	0%	0%	3%	14%	2%	0%	4%	0%	0%	8%	3%
Parking (#/hr)								10			36	
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					8.6		72.4	72.4			72.4	
Effective Green, g (s)					8.6		72.4	72.4			72.4	
Actuated g/C Ratio					0.10		0.80	0.80			0.80	
Clearance Time (s)					5.0		4.0	4.0			4.0	
Vehicle Extension (s)					5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					164		577	2365			2088	
v/s Ratio Prot								c0.39			0.21	
v/s Ratio Perm					0.03		0.02					
v/c Ratio					0.31		0.03	0.48			0.26	
Uniform Delay, d1					37.9		1.8	2.8			2.2	
Progression Factor					1.00		0.15	0.16			0.27	
Incremental Delay, d2					2.3		0.1	0.4			0.3	
Delay (s)					40.2		0.3	0.9			0.9	
Level of Service					D		A	A			A	
Approach Delay (s)		0.0			40.2			0.9			0.9	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	94	316	35	66	235	63	46	897	39	49	433	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.93	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1534	1680	1395	1491	1631	1369	1582	2827	949	1450	2595	823
Flt Permitted	0.50	1.00	1.00	0.39	1.00	1.00	0.44	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	812	1680	1395	607	1631	1369	739	2827	949	223	2595	823
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	103	347	38	73	258	69	51	986	43	54	476	52
RTOR Reduction (vph)	0	0	25	0	0	46	0	0	26	0	0	31
Lane Group Flow (vph)	103	347	13	73	258	23	51	986	17	54	476	21
Confl. Peds. (#/hr)	11		12	12		11	18		20	20		18
Heavy Vehicles (%)	0%	0%	0%	3%	3%	2%	0%	0%	0%	10%	7%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.6	30.6	30.6	34.6	30.6	30.6	38.4	35.4	35.4	40.4	36.4	36.4
Effective Green, g (s)	34.6	30.6	30.6	34.6	30.6	30.6	38.4	35.4	35.4	40.4	36.4	36.4
Actuated g/C Ratio	0.38	0.34	0.34	0.38	0.34	0.34	0.43	0.39	0.39	0.45	0.40	0.40
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	344	571	474	272	554	465	343	1111	373	154	1049	332
v/s Ratio Prot	c0.01	c0.21		0.01	0.16		0.00	c0.35		c0.02	0.18	
v/s Ratio Perm	0.10		0.01	0.09		0.02	0.06		0.02	0.14		0.03
v/c Ratio	0.30	0.61	0.03	0.27	0.47	0.05	0.15	0.89	0.05	0.35	0.45	0.06
Uniform Delay, d1	18.4	24.7	19.8	18.4	23.3	19.9	15.3	25.4	16.9	16.3	19.5	16.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.58	1.00	0.71	0.48	0.88
Incremental Delay, d2	0.5	4.8	0.1	0.5	2.8	0.2	0.1	8.1	0.2	1.4	1.4	0.4
Delay (s)	18.9	29.5	19.9	19.0	26.1	20.1	12.1	22.7	17.0	12.9	10.9	14.8
Level of Service	B	C	B	B	C	C	B	C	B	B	B	B
Approach Delay (s)		26.5			23.8			22.0			11.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1160: Ashland Ave. □ W 69th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	75	328	49	45	178	30	34	847	66	49	463	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	10	11	11	10	11	11
Total Lost time (s)		5.0			5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.94	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.99			1.00	1.00	0.97	1.00		0.99	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3051			1587	1344	1457	2626		1518	2441	
Flt Permitted		0.84			0.84	1.00	0.39	1.00		0.20	1.00	
Satd. Flow (perm)		2583			1342	1344	591	2626		314	2441	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	360	54	49	196	33	37	931	73	54	509	73
RTOR Reduction (vph)	0	10	0	0	0	20	0	6	0	0	13	0
Lane Group Flow (vph)	0	486	0	0	245	13	37	998	0	54	569	0
Confl. Peds. (#/hr)	47		48	48		47	32		48	48		32
Heavy Vehicles (%)	0%	6%	0%	0%	10%	3%	6%	4%	3%	4%	6%	8%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		35.0			35.0	35.0	46.0	46.0		46.0	46.0	
Effective Green, g (s)		35.0			35.0	35.0	46.0	46.0		46.0	46.0	
Actuated g/C Ratio		0.39			0.39	0.39	0.51	0.51		0.51	0.51	
Clearance Time (s)		5.0			5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		1004			521	522	302	1342		160	1247	
v/s Ratio Prot								c0.38			0.23	
v/s Ratio Perm		c0.19			0.18	0.01	0.06			0.17		
v/c Ratio		0.48			0.47	0.02	0.12	0.74		0.34	0.46	
Uniform Delay, d1		20.7			20.6	17.0	11.5	17.3		13.0	14.0	
Progression Factor		1.00			1.00	1.00	0.17	0.17		1.95	2.05	
Incremental Delay, d2		1.7			3.0	0.1	0.6	2.7		5.4	1.1	
Delay (s)		22.4			23.6	17.1	2.5	5.6		30.7	29.9	
Level of Service		C			C	B	A	A		C	C	
Approach Delay (s)		22.4			22.8			5.5			30.0	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. □ W 71st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	68	284	32	41	277	65	77	915	24	68	402	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1572	1647	1344	1513	1615	1349	1472	2940	1001	1491	3020	1201
Flt Permitted	0.42	1.00	1.00	0.44	1.00	1.00	0.45	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	688	1647	1344	706	1615	1349	692	2940	1001	238	3020	1201
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	75	312	35	45	304	71	85	1005	26	75	442	34
RTOR Reduction (vph)	0	0	23	0	0	48	0	0	15	0	0	20
Lane Group Flow (vph)	75	312	12	45	304	23	85	1005	11	75	442	14
Confl. Peds. (#/hr)	24		18	18		24	8		7	7		8
Heavy Vehicles (%)	1%	2%	3%	5%	4%	2%	8%	4%	17%	7%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.2	30.2	30.2	32.2	29.2	29.2	41.8	37.8	37.8	41.8	37.8	37.8
Effective Green, g (s)	34.2	30.2	30.2	32.2	29.2	29.2	41.8	37.8	37.8	41.8	37.8	37.8
Actuated g/C Ratio	0.38	0.34	0.34	0.36	0.32	0.32	0.46	0.42	0.42	0.46	0.42	0.42
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	552	450	279	523	437	356	1234	420	166	1268	504
v/s Ratio Prot	c0.01	c0.19		0.01	0.19		0.01	c0.34		c0.02	0.15	
v/s Ratio Perm	0.08		0.01	0.05		0.02	0.10		0.01	0.19		0.01
v/c Ratio	0.25	0.57	0.03	0.16	0.58	0.05	0.24	0.81	0.03	0.45	0.35	0.03
Uniform Delay, d1	18.6	24.5	20.0	19.4	25.3	20.9	13.8	23.0	15.3	15.7	17.7	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.66	0.57	1.00	1.21	1.26	1.00
Incremental Delay, d2	0.4	4.2	0.1	0.3	4.7	0.2	0.3	4.8	0.1	1.8	0.7	0.1
Delay (s)	19.0	28.7	20.1	19.7	30.0	21.1	9.4	17.8	15.4	20.7	23.0	15.4
Level of Service	B	C	C	B	C	C	A	B	B	C	C	B
Approach Delay (s)		26.2			27.4			17.1			22.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	42	171	29	29	108	32	48	936	27	38	386	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	10	11	11	10	10	10
Total Lost time (s)		5.0	5.0		5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.95		1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.97	1.00		0.99	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.99	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1560	1161		1579	1250	1411	2997		1506	2816	
Flt Permitted		0.92	1.00		0.91	1.00	0.46	1.00		0.18	1.00	
Satd. Flow (perm)		1447	1161		1447	1250	688	2997		289	2816	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	46	188	32	32	119	35	53	1029	30	42	424	30
RTOR Reduction (vph)	0	0	16	0	0	22	0	2	0	0	6	0
Lane Group Flow (vph)	0	234	16	0	151	13	53	1057	0	42	448	0
Confl. Peds. (#/hr)	7		33	33		7	20		27	27		20
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	24%	7%	17%	0%	6%	12%	10%	4%	7%	5%	6%	7%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		34.0	34.0		34.0	34.0	47.0	47.0		47.0	47.0	
Effective Green, g (s)		34.0	34.0		34.0	34.0	47.0	47.0		47.0	47.0	
Actuated g/C Ratio		0.38	0.38		0.38	0.38	0.52	0.52		0.52	0.52	
Clearance Time (s)		5.0	5.0		5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		546	438		546	472	359	1565		150	1470	
v/s Ratio Prot								c0.35			0.16	
v/s Ratio Perm		c0.16	0.01		0.10	0.01	0.08			0.15		
v/c Ratio		0.43	0.04		0.28	0.03	0.15	0.68		0.28	0.30	
Uniform Delay, d1		20.8	17.7		19.5	17.6	11.1	15.9		12.0	12.2	
Progression Factor		1.00	1.00		1.00	1.00	0.48	0.42		0.46	0.40	
Incremental Delay, d2		2.4	0.2		1.3	0.1	0.7	1.8		4.5	0.5	
Delay (s)		23.2	17.8		20.7	17.7	6.0	8.5		10.0	5.4	
Level of Service		C	B		C	B	A	A		A	A	
Approach Delay (s)		22.6			20.1			8.4			5.8	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		↰↑↑↱			↰↑↑↱		↰	↑↑↱		↰	↑↑↱	
Volume (vph)	46	287	17	43	202	51	12	880	63	43	398	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3052			3016		1475	2764		1563	2629	
Flt Permitted		0.86			0.85		0.46	1.00		0.19	1.00	
Satd. Flow (perm)		2649			2576		717	2764		320	2629	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	51	315	19	47	222	56	13	967	69	47	437	23
RTOR Reduction (vph)	0	4	0	0	20	0	0	6	0	0	4	0
Lane Group Flow (vph)	0	381	0	0	305	0	13	1030	0	47	456	0
Confl. Peds. (#/hr)	1		9	9		1	2		5	5		2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	2%	3%	6%	0%	2%	4%	8%	4%	5%	2%	7%	0%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		33.0			33.0		48.0	48.0		48.0	48.0	
Effective Green, g (s)		33.0			33.0		48.0	48.0		48.0	48.0	
Actuated g/C Ratio		0.37			0.37		0.53	0.53		0.53	0.53	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		971			944		382	1474		170	1402	
v/s Ratio Prot								c0.37			0.17	
v/s Ratio Perm		c0.14			0.12		0.02			0.15		
v/c Ratio		0.39			0.32		0.03	0.70		0.28	0.33	
Uniform Delay, d1		21.1			20.5		10.0	15.6		11.5	11.9	
Progression Factor		1.00			1.00		0.49	0.44		2.07	2.13	
Incremental Delay, d2		1.2			0.9		0.2	2.5		3.9	0.6	
Delay (s)		22.3			21.4		5.0	9.4		27.7	25.9	
Level of Service		C			C		A	A		C	C	
Approach Delay (s)		22.3			21.4			9.3			26.1	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1173: Ashland Ave. □ W 79th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱	↱	↰	↑↑	↱
Volume (vph)	95	463	42	35	336	53	51	630	55	34	372	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	10	11	11	10	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.95	1.00	1.00	0.88	1.00	1.00	0.87
Flpb, ped/bikes	0.98	1.00	1.00	0.98	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1510	1527	1231	1469	1527	1201	1339	2549	786	1462	2661	789
Flt Permitted	0.37	1.00	1.00	0.21	1.00	1.00	0.49	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	593	1527	1231	325	1527	1201	695	2549	786	467	2661	789
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	104	509	46	38	369	58	56	692	60	37	409	48
RTOR Reduction (vph)	0	0	30	0	0	37	0	1	29	0	0	26
Lane Group Flow (vph)	104	509	16	38	369	21	56	697	25	37	409	22
Confl. Peds. (#/hr)	41		54	54		41	47		41	41		47
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	10%	5%	3%	10%	9%	12%	6%	4%	6%	5%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	32.0	32.0	32.0	32.0	32.0	32.0	42.0	42.0	42.0	42.0	42.0	42.0
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	42.0	42.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	210	542	437	115	542	427	324	1189	366	217	1241	368
v/s Ratio Prot		c0.33			0.24			c0.27			0.15	
v/s Ratio Perm	0.18		0.01	0.12		0.02	0.08		0.03	0.08		0.03
v/c Ratio	0.50	0.94	0.04	0.33	0.68	0.05	0.17	0.59	0.07	0.17	0.33	0.06
Uniform Delay, d1	22.7	28.1	18.9	21.2	24.7	19.0	13.9	17.6	13.2	13.9	15.1	13.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.62	1.40	4.26	0.48	0.57	0.37
Incremental Delay, d2	8.1	26.2	0.2	7.5	6.8	0.2	1.0	1.9	0.3	1.6	0.7	0.3
Delay (s)	30.8	54.2	19.1	28.7	31.4	19.2	23.7	26.6	56.6	8.2	9.2	5.2
Level of Service	C	D	B	C	C	B	C	C	E	A	A	A
Approach Delay (s)		48.1			29.7			28.4			8.8	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1175: Ashland Ave. □ W 81st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑↑			↑↱	
Volume (vph)	0	0	0	26	49	27	69	795	0	0	394	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	9	11	11	11	11	11
Total Lost time (s)					5.0	5.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes					1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes					1.00	1.00	0.93	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.99	
Flt Protected					0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1621	1338	1390	2696			2508	
Flt Permitted					0.98	1.00	0.47	1.00			1.00	
Satd. Flow (perm)					1621	1338	688	2696			2508	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	29	54	30	76	874	0	0	433	37
RTOR Reduction (vph)	0	0	0	0	0	22	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	0	0	83	8	76	874	0	0	463	0
Confl. Peds. (#/hr)	12		11	11		12	41		5	5		41
Heavy Vehicles (%)	0%	0%	0%	4%	0%	4%	3%	3%	0%	0%	5%	3%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					25.0	25.0	56.0	56.0			56.0	
Effective Green, g (s)					25.0	25.0	56.0	56.0			56.0	
Actuated g/C Ratio					0.28	0.28	0.62	0.62			0.62	
Clearance Time (s)					5.0	5.0	4.0	4.0			4.0	
Lane Grp Cap (vph)					450	371	428	1677			1560	
v/s Ratio Prot								c0.32			0.18	
v/s Ratio Perm					0.05	0.01	0.11					
v/c Ratio					0.18	0.02	0.18	0.52			0.30	
Uniform Delay, d1					24.7	23.6	7.2	9.5			7.9	
Progression Factor					1.00	1.00	0.17	0.48			0.24	
Incremental Delay, d2					0.9	0.1	0.8	1.0			0.5	
Delay (s)					25.6	23.7	2.0	5.6			2.3	
Level of Service					C	C	A	A			A	
Approach Delay (s)		0.0			25.1			5.3			2.3	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	44	256	71	48	191	39	72	744	75	49	424	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	9	11	11	9	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.94	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1515	1647	1393	1584	3061		1537	2841	1022	1535	2582	873
Flt Permitted	0.60	1.00	1.00	0.47	1.00		0.45	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	949	1647	1393	780	3061		726	2841	1022	423	2582	873
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	48	281	78	53	210	43	79	818	82	54	466	32
RTOR Reduction (vph)	0	0	38	0	19	0	0	0	31	0	0	16
Lane Group Flow (vph)	48	281	40	53	234	0	79	818	51	54	466	16
Confl. Peds. (#/hr)	3		12	12		3	7		18	18		7
Heavy Vehicles (%)	5%	2%	0%	0%	1%	3%	0%	3%	1%	0%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	30.0	30.0	30.0	30.0	30.0		48.0	44.0	44.0	48.0	44.0	44.0
Effective Green, g (s)	30.0	30.0	30.0	30.0	30.0		48.0	44.0	44.0	48.0	44.0	44.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.53	0.49	0.49	0.53	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	316	549	464	260	1020		423	1388	499	275	1262	426
v/s Ratio Prot		c0.17			0.08		0.01	c0.29		c0.01	0.18	
v/s Ratio Perm	0.05		0.03	0.07			0.09		0.05	0.10		0.02
v/c Ratio	0.15	0.51	0.09	0.20	0.23		0.19	0.59	0.10	0.20	0.37	0.04
Uniform Delay, d1	21.1	24.1	20.6	21.5	21.7		10.4	16.5	12.4	10.8	14.3	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.79	0.72	0.49	0.46	0.41	0.45
Incremental Delay, d2	1.0	3.4	0.4	1.8	0.5		0.2	1.6	0.4	0.3	0.8	0.2
Delay (s)	22.1	27.5	21.0	23.2	22.2		8.5	13.5	6.4	5.3	6.7	5.5
Level of Service	C	C	C	C	C		A	B	A	A	A	A
Approach Delay (s)		25.6			22.4			12.5			6.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↑↱		↰	↑↑	
Volume (vph)	50	40	31	0	0	0	0	928	34	14	535	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	9	11	11
Total Lost time (s)		5.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		1.00	0.95	
Frpb, ped/bikes		0.99						1.00		1.00	1.00	
Flpb, ped/bikes		0.99						1.00		0.99	1.00	
Frt		0.97						0.99		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		1607						2645		1527	2645	
Flt Permitted		0.98						1.00		0.24	1.00	
Satd. Flow (perm)		1607						2645		393	2645	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	55	44	34	0	0	0	0	1020	37	15	588	0
RTOR Reduction (vph)	0	16	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	117	0	0	0	0	0	1055	0	15	588	0
Confl. Peds. (#/hr)	7		8	8		7	11		13	13		11
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	2%	6%	0%	0%	0%	0%	5%	0%	0%	5%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		14.5						66.5		66.5	66.5	
Effective Green, g (s)		14.5						66.5		66.5	66.5	
Actuated g/C Ratio		0.16						0.74		0.74	0.74	
Clearance Time (s)		5.0						4.0		4.0	4.0	
Vehicle Extension (s)		6.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		258						1954		290	1954	
v/s Ratio Prot								c0.40			0.22	
v/s Ratio Perm		0.07								0.04		
v/c Ratio		0.45						0.54		0.05	0.30	
Uniform Delay, d1		34.2						5.1		3.2	3.9	
Progression Factor		1.00						1.00		2.59	2.64	
Incremental Delay, d2		3.5						1.1		0.3	0.4	
Delay (s)		37.7						6.2		8.6	10.8	
Level of Service		D						A		A	B	
Approach Delay (s)		37.7			0.0			6.2			10.7	
Approach LOS		D			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. □ W 87th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	103	984	115	53	710	127	228	946	53	79	386	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.95	1.00	1.00	0.88	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1504	3210	1283	1564	3179	1253	1530	2739	918	1578	2582	871
Flt Permitted	0.19	1.00	1.00	0.12	1.00	1.00	0.40	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	298	3210	1283	200	3179	1253	647	2739	918	199	2582	871
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	113	1081	126	58	780	140	251	1040	58	87	424	56
RTOR Reduction (vph)	0	0	57	0	0	60	0	0	37	0	0	37
Lane Group Flow (vph)	113	1081	69	58	780	80	251	1040	21	87	424	19
Confl. Peds. (#/hr)	34		53	53		34	16		92	92		16
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	6%	3%	3%	2%	4%	8%	4%	5%	2%	1%	5%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	40.1	34.5	34.5	37.1	33.0	33.0	48.4	36.8	36.8	42.0	33.4	33.4
Effective Green, g (s)	40.1	34.5	34.5	37.1	33.0	33.0	48.4	36.8	36.8	42.0	33.4	33.4
Actuated g/C Ratio	0.40	0.34	0.34	0.37	0.33	0.33	0.48	0.37	0.37	0.42	0.33	0.33
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	0.2	3.0	3.0	0.2	3.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0
Lane Grp Cap (vph)	187	1107	442	130	1049	413	419	1007	337	202	862	290
v/s Ratio Prot	c0.03	c0.34		0.02	0.25		c0.07	c0.38		0.04	0.16	
v/s Ratio Perm	0.21		0.05	0.15		0.06	0.22		0.02	0.14		0.02
v/c Ratio	0.60	0.98	0.16	0.45	0.74	0.19	0.60	1.03	0.06	0.43	0.49	0.06
Uniform Delay, d1	21.1	32.3	22.7	23.6	29.7	24.0	16.3	31.6	20.4	20.1	26.5	22.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	22.0	0.8	0.9	4.8	1.0	3.5	37.1	0.4	3.1	2.0	0.4
Delay (s)	24.8	54.3	23.4	24.5	34.5	25.0	19.8	68.7	20.8	23.1	28.5	23.1
Level of Service	C	D	C	C	C	C	B	E	C	C	C	C
Approach Delay (s)		48.8			32.6			57.6			27.2	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. □ W 91st St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	16	8	24	21	2	53	7	1217	26	16	656	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	9	11	11	9	11	11
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.97		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.93			0.91		1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1512			1449		1344	2582		1370	2680	
Flt Permitted		0.89			0.90		0.36	1.00		0.17	1.00	
Satd. Flow (perm)		1361			1327		515	2582		244	2680	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	18	9	26	23	2	58	8	1337	29	18	721	11
RTOR Reduction (vph)	0	22	0	0	50	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	31	0	0	33	0	8	1365	0	18	731	0
Confl. Peds. (#/hr)	16		4	4		16	4		9	9		4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	14%	4%	0%	12%	4%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.3			12.3		68.7	68.7		68.7	68.7	
Effective Green, g (s)		12.3			12.3		68.7	68.7		68.7	68.7	
Actuated g/C Ratio		0.14			0.14		0.76	0.76		0.76	0.76	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		8.0			8.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		186			181		393	1970		186	2045	
v/s Ratio Prot								c0.53			0.27	
v/s Ratio Perm		0.02			c0.02		0.02			0.07		
v/c Ratio		0.16			0.18		0.02	0.69		0.10	0.36	
Uniform Delay, d1		34.3			34.4		2.6	5.4		2.7	3.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.8			2.1		0.1	2.0		1.0	0.5	
Delay (s)		36.1			36.5		2.7	7.4		3.8	4.0	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		36.1			36.5			7.4			4.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱	↱	↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	175	462	42	62	594	226	84	658	30	231	399	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	0.98		1.00	1.00	0.96	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1519	3012	1280	1511	2950		1542	3049	1241	1533	3049	1122
Flt Permitted	0.13	1.00	1.00	0.38	1.00		0.49	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	213	3012	1280	604	2950		796	3049	1241	308	3049	1122
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	192	508	46	68	653	248	92	723	33	254	438	97
RTOR Reduction (vph)	0	1	26	0	37	0	0	0	23	0	0	54
Lane Group Flow (vph)	192	512	15	68	864	0	92	723	10	254	438	43
Confl. Peds. (#/hr)	43		37	37		43	60		26	26		60
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	5%	5%	0%	5%	5%	8%	2%	3%	0%	4%	3%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	45.4	37.4	37.4	41.8	35.6		40.9	32.4	32.4	48.4	36.9	36.9
Effective Green, g (s)	45.4	37.4	37.4	41.8	35.6		40.9	32.4	32.4	48.4	36.9	36.9
Actuated g/C Ratio	0.43	0.36	0.36	0.40	0.34		0.39	0.31	0.31	0.46	0.35	0.35
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	3.0	3.0	4.0	3.0	3.0
Lane Grp Cap (vph)	191	1072	455	294	1000		370	940	382	293	1071	394
v/s Ratio Prot	c0.08	0.17		0.01	0.29		0.02	0.24		c0.11	0.14	
v/s Ratio Perm	c0.36		0.01	0.08			0.08		0.01	c0.29		0.04
v/c Ratio	1.01	0.48	0.03	0.23	0.86		0.25	0.77	0.03	0.87	0.41	0.11
Uniform Delay, d1	24.3	26.2	22.0	20.1	32.4		20.8	32.9	25.3	20.8	25.8	23.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	66.5	1.5	0.1	0.4	9.8		0.5	6.0	0.1	23.2	1.2	0.6
Delay (s)	90.8	27.8	22.1	20.5	42.3		21.3	38.9	25.4	44.0	26.9	23.5
Level of Service	F	C	C	C	D		C	D	C	D	C	C
Approach Delay (s)		43.7			40.8			36.5			32.0	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1001: Ashland Ave. □ W Irving Park Rd.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	206	762	164	125	807	48	118	907	102	59	939	167
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	12	10	9	13	10	9
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00		1.00	1.00	0.89	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1578	3160	1285	1545	3142		1659	2745	830	1764	3002	1103
Flt Permitted	0.15	1.00	1.00	0.21	1.00		0.12	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	250	3160	1285	337	3142		211	2745	830	284	3002	1103
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	217	802	173	132	849	51	124	955	107	62	988	176
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	217	802	173	132	900	0	124	955	107	62	988	176
Confl. Peds. (#/hr)	72		69	69		72	59		81	81		59
Confl. Bikes (#/hr)			5			7			7			6
Heavy Vehicles (%)	1%	1%	2%	3%	0%	4%	3%	0%	3%	0%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								36	36		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	37.4	31.4	31.4	36.6	31.0		38.6	33.1	33.1	35.4	31.5	31.5
Effective Green, g (s)	37.4	31.4	31.4	36.6	31.0		38.6	33.1	33.1	35.4	31.5	31.5
Actuated g/C Ratio	0.42	0.35	0.35	0.41	0.34		0.43	0.37	0.37	0.39	0.35	0.35
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2
Lane Grp Cap (vph)	192	1102	448	212	1082		178	1009	305	175	1050	386
v/s Ratio Prot	c0.08	0.25		0.04	0.29		c0.04	c0.35		0.02	0.33	
v/s Ratio Perm	c0.39		0.13	0.21			0.25		0.13	0.12		0.16
v/c Ratio	1.13	0.73	0.39	0.62	0.83		0.70	0.95	0.35	0.35	0.94	0.46
Uniform Delay, d1	22.8	25.6	22.0	18.5	27.1		18.8	27.6	20.7	18.7	28.3	22.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.66	0.79	0.71	1.00	1.00	1.00
Incremental Delay, d2	104.3	4.2	2.5	4.1	7.5		7.1	14.9	2.4	0.5	16.8	3.8
Delay (s)	127.1	29.8	24.6	22.5	34.6		19.5	36.5	17.0	19.1	45.1	26.5
Level of Service	F	C	C	C	C		B	D	B	B	D	C
Approach Delay (s)		46.7			33.0			33.0			41.1	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1003: Ashland Ave. □ W Grace St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣					↰	↑↱		↰	↑↱	
Volume (vph)	32	52	30	0	0	0	34	1036	53	39	1176	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	12	10	10	11	10	10
Total Lost time (s)		4.0					4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00					1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Frt		0.96					1.00	0.99		1.00	1.00	
Flt Protected		0.99					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1513					1710	2624		1605	2659	
Flt Permitted		0.99					0.15	1.00		0.19	1.00	
Satd. Flow (perm)		1513					279	2624		320	2659	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	34	55	32	0	0	0	36	1091	56	41	1238	36
RTOR Reduction (vph)	0	14	0	0	0	0	0	4	0	0	2	0
Lane Group Flow (vph)	0	107	0	0	0	0	36	1143	0	41	1272	0
Confl. Peds. (#/hr)	23		20	20		23	11		22	22		11
Confl. Bikes (#/hr)			1			1			1			3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	3%	2%	3%
Parking (#/hr)								44			38	
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		26.0					56.0	56.0		56.0	56.0	
Effective Green, g (s)		26.0					56.0	56.0		56.0	56.0	
Actuated g/C Ratio		0.29					0.62	0.62		0.62	0.62	
Clearance Time (s)		4.0					4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		437					173	1632		199	1654	
v/s Ratio Prot								0.44			c0.48	
v/s Ratio Perm		0.07					0.13			0.13		
v/c Ratio		0.24					0.21	0.70		0.21	0.77	
Uniform Delay, d1		24.5					7.4	11.4		7.4	12.3	
Progression Factor		1.00					2.14	2.09		0.29	0.52	
Incremental Delay, d2		1.3					2.2	2.0		1.4	2.1	
Delay (s)		25.8					18.0	25.8		3.5	8.4	
Level of Service		C					B	C		A	A	
Approach Delay (s)		25.8			0.0			25.6			8.3	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1005: Ashland Ave. □ W Addison St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	111	531	69	130	450	75	45	803	80	74	976	75
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	12	10	10	12	10	10
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.92
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1521	1573	1385	1555	1588	1367	1632	2671	961	1692	2696	977
Flt Permitted	0.36	1.00	1.00	0.29	1.00	1.00	0.14	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	583	1573	1385	478	1588	1367	237	2671	961	380	2696	977
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	117	559	73	137	474	79	47	845	84	78	1027	79
RTOR Reduction (vph)	0	0	16	0	0	22	0	0	22	0	0	18
Lane Group Flow (vph)	117	559	57	137	474	57	47	845	62	78	1027	61
Confl. Peds. (#/hr)	30		19	19		30	25		2	2		25
Confl. Bikes (#/hr)			2			7						
Heavy Vehicles (%)	0%	3%	0%	2%	2%	0%	4%	1%	0%	1%	3%	0%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	44.0	44.0	44.0	44.0	44.0	44.0	37.0	37.0	37.0	37.0	37.0	37.0
Effective Green, g (s)	44.0	44.0	44.0	44.0	44.0	44.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	285	769	677	233	776	668	97	1098	395	156	1108	401
v/s Ratio Prot		c0.36			0.30			0.32			c0.38	
v/s Ratio Perm	0.20		0.04	0.29		0.04	0.20		0.06	0.21		0.06
v/c Ratio	0.41	0.73	0.08	0.59	0.61	0.08	0.48	0.77	0.16	0.50	0.93	0.15
Uniform Delay, d1	14.7	18.2	12.3	16.5	16.8	12.3	19.5	22.8	16.7	19.6	25.2	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.77	1.10
Incremental Delay, d2	4.3	5.9	0.2	10.4	3.6	0.2	16.3	5.2	0.8	7.1	10.1	0.5
Delay (s)	19.0	24.2	12.5	26.9	20.3	12.5	35.8	28.0	17.5	25.5	29.5	18.9
Level of Service	B	C	B	C	C	B	D	C	B	C	C	B
Approach Delay (s)		22.2			20.7			27.5			28.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1007: Ashland Ave. □ W Roscoe St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	80	157	77	20	979	0	0	1145	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	10	10	10	10	10
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					1.00		1.00	0.95			0.95	1.00
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.84
Flpb, ped/bikes					0.99		1.00	1.00			1.00	1.00
Frt					0.97		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1620		1653	2955			2597	768
Flt Permitted					0.99		0.17	1.00			1.00	1.00
Satd. Flow (perm)					1620		304	2955			2597	768
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	84	165	81	21	1031	0	0	1205	62
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	0	0	0	14
Lane Group Flow (vph)	0	0	0	0	316	0	21	1031	0	0	1205	48
Confl. Peds. (#/hr)	26		25	25		26	39		18	18		39
Confl. Bikes (#/hr)			1			1			6			5
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								6			48	48
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					24.0		53.0	53.0			53.0	53.0
Effective Green, g (s)					24.0		53.0	53.0			53.0	53.0
Actuated g/C Ratio					0.28		0.62	0.62			0.62	0.62
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					457		189	1842			1619	478
v/s Ratio Prot								0.35			c0.46	
v/s Ratio Perm					0.20		0.07					0.06
v/c Ratio					0.69		0.11	0.56			0.74	0.10
Uniform Delay, d1					27.2		6.5	9.3			11.2	6.4
Progression Factor					1.00		1.98	2.26			1.00	1.00
Incremental Delay, d2					8.4		0.9	0.9			3.1	0.4
Delay (s)					35.6		13.7	21.8			14.4	6.8
Level of Service					D		B	C			B	A
Approach Delay (s)		0.0			35.6			21.7			14.0	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1009: Ashland Ave. □ W School St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↑	↱
Volume (vph)	106	173	33	10	21	23	41	1046	43	58	953	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	10	9
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		0.99			0.97		1.00	1.00		1.00	1.00	0.50
Flpb, ped/bikes		0.98			0.99		0.93	1.00		1.00	1.00	1.00
Frt		0.99			0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1577			1518		1543	2900		1653	2973	585
Flt Permitted		0.87			0.93		0.22	1.00		0.18	1.00	1.00
Satd. Flow (perm)		1399			1427		361	2900		307	2973	585
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	112	182	35	11	22	24	43	1101	45	61	1003	61
RTOR Reduction (vph)	0	5	0	0	16	0	0	3	0	0	0	25
Lane Group Flow (vph)	0	324	0	0	41	0	43	1143	0	61	1003	36
Confl. Peds. (#/hr)	42		71	71		42	139		29	29		139
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	0%	1%	0%	0%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		28.0			28.0		49.0	49.0		49.0	49.0	49.0
Effective Green, g (s)		28.0			28.0		49.0	49.0		49.0	49.0	49.0
Actuated g/C Ratio		0.33			0.33		0.58	0.58		0.58	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		460			470		208	1671		176	1713	337
v/s Ratio Prot								c0.39			0.34	
v/s Ratio Perm		c0.23			0.03		0.12			0.20		0.06
v/c Ratio		0.70			0.09		0.21	0.68		0.35	0.59	0.11
Uniform Delay, d1		24.9			19.7		8.7	12.6		9.5	11.5	8.1
Progression Factor		1.00			1.00		1.00	1.00		1.27	1.36	1.80
Incremental Delay, d2		8.7			0.4		2.2	2.3		3.5	1.0	0.4
Delay (s)		33.6			20.0		10.9	14.9		15.6	16.6	15.0
Level of Service		C			C		B	B		B	B	B
Approach Delay (s)		33.6			20.0			14.7			16.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

Movement	EBL2	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations		↱				↑	↰			↰	↑↑	↱
Volume (vph)	1	333	48	32	4	322	139	69	16	65	937	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	12	11	10	12	11	11	10	10
Total Lost time (s)		5.0				5.0	5.0			6.0	6.0	6.0
Lane Util. Factor		1.00				1.00	1.00			1.00	0.95	1.00
Frpb, ped/bikes		0.98				1.00	0.83			1.00	1.00	0.75
Flpb, ped/bikes		1.00				1.00	1.00			0.98	1.00	1.00
Frt		0.97				1.00	0.85			1.00	1.00	0.85
Flt Protected		1.00				1.00	1.00			0.95	1.00	1.00
Satd. Flow (prot)		1613				1722	1097			1619	2785	807
Flt Permitted		1.00				1.00	1.00			0.13	1.00	1.00
Satd. Flow (perm)		1612				1716	1097			220	2785	807
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	351	51	34	4	339	146	73	17	68	986	96
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	437	0	0	0	343	219	0	0	85	986	96
Confl. Peds. (#/hr)			44		44		76			63		95
Confl. Bikes (#/hr)			5				13					11
Heavy Vehicles (%)	0%	3%	4%	0%	0%	1%	11%	1%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)											24	24
Turn Type	Perm	NA			Perm	NA	Perm		Perm	Perm	NA	Perm
Protected Phases		10				14					2	
Permitted Phases	10				14		14		2	2		2
Actuated Green, G (s)		27.0				27.0	27.0			31.0	31.0	31.0
Effective Green, g (s)		27.0				27.0	27.0			31.0	31.0	31.0
Actuated g/C Ratio		0.27				0.27	0.27			0.31	0.31	0.31
Clearance Time (s)		5.0				5.0	5.0			6.0	6.0	6.0
Lane Grp Cap (vph)		435				463	296			68	863	250
v/s Ratio Prot											0.35	
v/s Ratio Perm		c0.27				0.20	0.20			0.39		0.12
v/c Ratio		1.00				0.74	0.74			1.25	1.14	0.38
Uniform Delay, d1		36.5				33.3	33.3			34.5	34.5	27.0
Progression Factor		1.00				1.00	1.00			1.00	1.00	1.00
Incremental Delay, d2		44.3				10.2	15.3			190.6	77.9	4.4
Delay (s)		80.8				43.5	48.6			225.1	112.4	31.4
Level of Service		F				D	D			F	F	C
Approach Delay (s)		80.8				45.5					114.0	
Approach LOS		F				D					F	

Intersection Summary			
HCM 2000 Control Delay	84.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBT	SBR	SBR2	SEL2	SEL	SET	SER	SER2	NWL2	NWL
Lane Configurations		↰	↑↱				↰	↱				↰
Volume (vph)	25	67	856	36	8	4	49	251	86	11	7	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	9	9	11	11	11	12	9
Total Lost time (s)		6.0	6.0				6.0	6.0				6.0
Lane Util. Factor		1.00	0.95				1.00	1.00				1.00
Frpb, ped/bikes		1.00	0.99				1.00	1.00				1.00
Flpb, ped/bikes		1.00	1.00				1.00	1.00				1.00
Frt		1.00	0.99				1.00	0.96				1.00
Flt Protected		0.95	1.00				0.95	1.00				0.95
Satd. Flow (prot)		1692	2978				1511	1639				1539
Flt Permitted		0.13	1.00				0.20	1.00				0.26
Satd. Flow (perm)		230	2978				310	1639				415
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	71	901	38	8	4	52	264	91	12	7	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	97	947	0	0	0	56	367	0	0	0	40
Confl. Peds. (#/hr)		95		63								
Confl. Bikes (#/hr)				6								
Heavy Vehicles (%)	4%	0%	4%	0%	0%	0%	2%	2%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)			0									
Turn Type	Perm	Perm	NA			Perm	Perm	NA			Perm	Perm
Protected Phases			6					4				
Permitted Phases	6	6				4	4				8	8
Actuated Green, G (s)		31.0	31.0				25.0	25.0				25.0
Effective Green, g (s)		31.0	31.0				25.0	25.0				25.0
Actuated g/C Ratio		0.31	0.31				0.25	0.25				0.25
Clearance Time (s)		6.0	6.0				6.0	6.0				6.0
Lane Grp Cap (vph)		71	923				77	409				103
v/s Ratio Prot			0.32					0.22				
v/s Ratio Perm		c0.42					0.18					0.10
v/c Ratio		1.37	1.03				0.73	0.90				0.39
Uniform Delay, d1		34.5	34.5				34.4	36.3				31.1
Progression Factor		1.00	1.00				1.00	1.00				1.00
Incremental Delay, d2		232.0	36.4				45.5	25.0				10.7
Delay (s)		266.5	70.9				79.9	61.2				41.8
Level of Service		F	E				E	E				D
Approach Delay (s)			89.1					63.7				
Approach LOS			F					E				

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

	↖	↖	↱
Movement	NWT	NWR	NWR2
Lane Configurations	↱		
Volume (vph)	279	97	8
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	11	11	11
Total Lost time (s)	6.0		
Lane Util. Factor	1.00		
Frpb, ped/bikes	1.00		
Flpb, ped/bikes	1.00		
Frt	0.96		
Flt Protected	1.00		
Satd. Flow (prot)	1661		
Flt Permitted	1.00		
Satd. Flow (perm)	1661		
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	294	102	8
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	404	0	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	0%	0%	25%
Bus Blockages (#/hr)	0	0	0
Parking (#/hr)			
Turn Type	NA		
Protected Phases	8		
Permitted Phases			
Actuated Green, G (s)	25.0		
Effective Green, g (s)	25.0		
Actuated g/C Ratio	0.25		
Clearance Time (s)	6.0		
Lane Grp Cap (vph)	415		
v/s Ratio Prot	c0.24		
v/s Ratio Perm			
v/c Ratio	0.97		
Uniform Delay, d1	37.2		
Progression Factor	1.00		
Incremental Delay, d2	38.0		
Delay (s)	75.2		
Level of Service	E		
Approach Delay (s)	72.2		
Approach LOS	E		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1012: Ashland Ave. □ W Barry Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	127	228	30	46	1125	0	0	989	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	10	11	11	10
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					1.00		1.00	0.95			0.95	1.00
Frpb, ped/bikes					1.00		1.00	1.00			1.00	0.78
Flpb, ped/bikes					0.98		0.97	1.00			1.00	1.00
Frt					0.99		1.00	1.00			1.00	0.85
Flt Protected					0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1925		1609	2979			2808	813
Flt Permitted					0.98		0.22	1.00			1.00	1.00
Satd. Flow (perm)					1925		373	2979			2808	813
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	134	240	32	48	1184	0	0	1041	37
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	0	0	0	13
Lane Group Flow (vph)	0	0	0	0	402	0	48	1184	0	0	1041	24
Confl. Peds. (#/hr)	26		40	40		26	56		33	33		56
Confl. Bikes (#/hr)			2			2			2			3
Heavy Vehicles (%)	0%	0%	0%	3%	0%	3%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								16			30	30
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					25.0		52.0	52.0			52.0	52.0
Effective Green, g (s)					25.0		52.0	52.0			52.0	52.0
Actuated g/C Ratio					0.29		0.61	0.61			0.61	0.61
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					566		228	1822			1717	497
v/s Ratio Prot								c0.40			0.37	
v/s Ratio Perm					0.21		0.13					0.03
v/c Ratio					0.71		0.21	0.65			0.61	0.05
Uniform Delay, d1					26.8		7.4	10.6			10.2	6.6
Progression Factor					1.00		1.44	1.67			1.00	1.00
Incremental Delay, d2					7.4		1.6	1.4			1.6	0.2
Delay (s)					34.2		12.2	19.1			11.8	6.8
Level of Service					C		B	B			B	A
Approach Delay (s)		0.0			34.2			18.8			11.6	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. □ W Wellington Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥					↰	↑↑	↱	↰	↑↱	
Volume (vph)	120	203	99	0	0	0	173	1090	120	15	952	101
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	10	9	11	10	9
Total Lost time (s)		4.0					3.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00					1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99					1.00	1.00	0.94	1.00	0.99	
Flpb, ped/bikes		0.99					1.00	1.00	1.00	0.99	1.00	
Frt		0.97					1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1689					1621	2848	1009	1641	2784	
Flt Permitted		0.99					0.15	1.00	1.00	0.23	1.00	
Satd. Flow (perm)		1689					248	2848	1009	401	2784	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	214	104	0	0	0	182	1147	126	16	1002	106
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	33	0	10	0
Lane Group Flow (vph)	0	431	0	0	0	0	182	1147	93	16	1098	0
Confl. Peds. (#/hr)	27		8	8		27	22		11	11		22
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	2%	2%	2%	0%	0%	43%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA					pm+pt	NA	Perm	Perm	NA	
Protected Phases		4					5	2			6	
Permitted Phases	4						2		2	6		
Actuated Green, G (s)		25.0					52.0	52.0	52.0	42.0	42.0	
Effective Green, g (s)		25.0					52.0	52.0	52.0	42.0	42.0	
Actuated g/C Ratio		0.29					0.61	0.61	0.61	0.49	0.49	
Clearance Time (s)		4.0					3.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		496					264	1742	617	198	1375	
v/s Ratio Prot							0.06	c0.40			c0.39	
v/s Ratio Perm		0.26					0.36		0.09	0.04		
v/c Ratio		0.87					0.69	0.66	0.15	0.08	0.80	
Uniform Delay, d1		28.5					11.1	10.7	7.1	11.3	18.0	
Progression Factor		1.00					1.57	0.26	0.01	1.70	1.72	
Incremental Delay, d2		18.4					1.3	0.2	0.0	0.6	4.0	
Delay (s)		46.9					18.8	3.0	0.1	19.9	34.8	
Level of Service		D					B	A	A	B	C	
Approach Delay (s)		46.9			0.0			4.7			34.6	
Approach LOS		D			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↱	
Volume (vph)	169	472	55	166	562	82	15	1396	114	65	1365	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	11	11	9	11	11	11
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.93	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1580	1647	1303	1562	1647	1296	1653	2357	543	1653	2845	
Flt Permitted	0.14	1.00	1.00	0.19	1.00	1.00	0.10	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	229	1647	1303	318	1647	1296	178	2357	543	178	2845	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	178	497	58	175	592	86	16	1469	120	68	1437	133
RTOR Reduction (vph)	0	0	34	0	0	34	0	0	28	0	8	0
Lane Group Flow (vph)	178	497	24	175	592	52	16	1469	92	68	1562	0
Confl. Peds. (#/hr)	29		30	30		29	52		17	17		52
Confl. Bikes (#/hr)			12			7			9			8
Heavy Vehicles (%)	1%	2%	0%	2%	2%	1%	0%	1%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								92	92		16	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	35.0	29.0	29.0	35.0	29.0	29.0	39.0	39.0	39.0	39.0	39.0	
Effective Green, g (s)	35.0	29.0	29.0	35.0	29.0	29.0	39.0	39.0	39.0	39.0	39.0	
Actuated g/C Ratio	0.41	0.34	0.34	0.41	0.34	0.34	0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	189	561	444	218	561	442	81	1081	249	81	1305	
v/s Ratio Prot	c0.07	0.30		0.06	c0.36			c0.62			0.55	
v/s Ratio Perm	0.32		0.02	0.27		0.04	0.09		0.17	0.38		
v/c Ratio	0.94	0.89	0.05	0.80	1.06	0.12	0.20	1.36	0.37	0.84	1.20	
Uniform Delay, d1	21.3	26.4	18.8	19.5	28.0	19.2	13.7	23.0	15.0	20.2	23.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.97	0.84	0.83	0.87	
Incremental Delay, d2	51.8	18.4	0.2	26.0	53.4	0.5	3.4	165.4	2.7	56.4	95.3	
Delay (s)	73.0	44.8	19.0	45.5	81.4	19.8	14.0	187.9	15.3	73.1	115.4	
Level of Service	E	D	B	D	F	B	B	F	B	E	F	
Approach Delay (s)		49.6			67.8			173.2			113.6	
Approach LOS		D			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	115.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1019: Ashland Ave. □ W Wrightwood Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	54	190	49	97	180	31	53	1279	80	32	1009	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	10	10	11	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		1.00			1.00		1.00	1.00	0.95	1.00	1.00	0.91
Flpb, ped/bikes		1.00			1.00		0.99	1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1550			1566		1639	2702	925	1653	2916	1131
Flt Permitted		0.88			0.73		0.21	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)		1373			1165		356	2702	925	221	2916	1131
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	200	52	102	189	33	56	1346	84	34	1062	53
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	309	0	0	324	0	56	1346	84	34	1062	53
Confl. Peds. (#/hr)	9		11	11		9	20		8	8		20
Confl. Bikes (#/hr)			3						1			2
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	0%	1%	1%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								38	38		0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		27.0			27.0		50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)		27.0			27.0		50.0	50.0	50.0	50.0	50.0	50.0
Actuated g/C Ratio		0.32			0.32		0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)		436			370		209	1589	544	130	1715	665
v/s Ratio Prot								c0.50			0.36	
v/s Ratio Perm		0.23			c0.28		0.16		0.09	0.15		0.05
v/c Ratio		0.71			0.88		0.27	0.85	0.15	0.26	0.62	0.08
Uniform Delay, d1		25.5			27.4		8.6	14.4	7.9	8.5	11.3	7.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	0.17	0.15	0.20
Incremental Delay, d2		9.4			24.0		3.1	5.8	0.6	0.4	0.2	0.0
Delay (s)		34.9			51.4		11.7	20.2	8.5	1.9	1.9	1.5
Level of Service		C			D		B	C	A	A	A	A
Approach Delay (s)		34.9			51.4			19.2			1.9	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

1023: Ashland Ave. □ W Fullerton Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations	↰	↑↱		↰	↑	↱		↑↑	↱	↰	↑↑	↱
Volume (vph)	148	619	16	97	519	28	0	1197	89	38	1020	171
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	10	10	10	10	10	10
Total Lost time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0	2.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.93	1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1580	3146		1521	1631	1270		2971	1115	1596	2944	1125
Flt Permitted	0.11	1.00		0.25	1.00	1.00		1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	180	3146		397	1631	1270		2971	1115	126	2944	1125
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	652	17	102	546	29	0	1260	94	40	1074	180
RTOR Reduction (vph)	0	1	0	0	0	19	0	0	43	0	0	43
Lane Group Flow (vph)	156	668	0	102	546	10	0	1260	51	40	1074	137
Confl. Peds. (#/hr)	21		21	21		21	20		34	34		20
Confl. Bikes (#/hr)			9			2			6			
Heavy Vehicles (%)	1%	1%	0%	1%	3%	4%	0%	1%	1%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	custom	pm+pt	NA	Perm
Protected Phases	7	4		3	8			2 10		1	6	
Permitted Phases	4			8		8			2	6		6
Actuated Green, G (s)	49.0	43.0		49.0	43.0	43.0		60.5	55.6	61.1	55.6	55.6
Effective Green, g (s)	49.0	43.0		49.0	43.0	43.0		58.5	55.6	61.1	55.6	55.6
Actuated g/C Ratio	0.38	0.33		0.38	0.33	0.33		0.45	0.43	0.47	0.43	0.43
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0			5.0	2.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	1040		201	539	420		1336	476	121	1259	481
v/s Ratio Prot	c0.05	0.21		0.02	0.33			c0.42		c0.01	0.36	
v/s Ratio Perm	c0.39			0.17		0.01			0.05	0.14		0.12
v/c Ratio	1.18	0.64		0.51	1.01	0.02		0.94	0.11	0.33	0.85	0.28
Uniform Delay, d1	37.3	37.0		28.2	43.5	29.3		34.2	22.3	24.5	33.5	24.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.95	1.70	1.00	1.00	1.00
Incremental Delay, d2	135.4	3.0		2.0	42.0	0.1		1.9	0.0	1.6	7.5	1.5
Delay (s)	172.7	40.0		30.3	85.5	29.4		34.2	37.9	26.1	41.0	25.7
Level of Service	F	D		C	F	C		C	D	C	D	C
Approach Delay (s)		65.1			74.8			34.4			38.4	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙	↗
Movement	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL
Lane Configurations	↑	↱		↰↑↱		↰	↑↱		↰	↑↱		↗
Volume (vph)	428	209	29	532	154	125	1283	56	132	1110	11	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	10	10	10	16
Total Lost time (s)	5.0	5.0		5.0		3.0	5.0		3.0	5.0		
Lane Util. Factor	1.00	1.00		0.95		1.00	0.95		1.00	0.95		
Frpb, ped/bikes	1.00	0.96		1.00		1.00	1.00		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.85		0.97		1.00	0.99		1.00	1.00		
Flt Protected	1.00	1.00		1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1740	1414		3141		1653	3089		1596	2864		
Flt Permitted	1.00	1.00		0.91		0.08	1.00		0.08	1.00		
Satd. Flow (perm)	1740	1414		2861		142	3089		137	2864		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92
Adj. Flow (vph)	451	220	31	560	162	132	1351	59	139	1168	12	0
RTOR Reduction (vph)	0	0	0	16	0	0	2	0	0	52	0	0
Lane Group Flow (vph)	451	220	0	737	0	132	1408	0	139	1128	0	0
Confl. Peds. (#/hr)		34			11	18						
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	1%	2%	0%	4%	9%	2%
Parking (#/hr)							0			6		
Turn Type	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA		
Protected Phases	4			8		5	2		1	6		10
Permitted Phases		4	8			2			6			
Actuated Green, G (s)	59.0	59.0		59.0		57.9	49.0		58.1	49.1		
Effective Green, g (s)	59.0	59.0		59.0		57.9	49.0		58.1	49.1		
Actuated g/C Ratio	0.45	0.45		0.45		0.45	0.38		0.45	0.38		
Clearance Time (s)	5.0	5.0		5.0		3.0	5.0		3.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	789	641		1298		166	1164		162	1081		
v/s Ratio Prot	c0.26					0.05	c0.46		c0.06	0.39		
v/s Ratio Perm		0.16		0.26		0.30			0.32			
v/c Ratio	0.57	0.34		0.57		0.80	1.21		0.86	1.04		
Uniform Delay, d1	26.2	23.0		26.1		28.6	40.5		30.8	40.5		
Progression Factor	1.00	1.00		1.00		1.18	0.96		1.63	0.48		
Incremental Delay, d2	3.0	1.5		1.8		15.1	99.5		24.3	34.4		
Delay (s)	29.2	24.4		27.9		49.0	138.4		74.3	53.9		
Level of Service	C	C		C		D	F		E	D		
Approach Delay (s)	27.6			27.9			130.8			56.0		0.0
Approach LOS	C			C			F			E		A

Intersection Summary			
HCM 2000 Control Delay	73.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	113.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↱		↰	↑↑	↱	↰	↑↱	
Volume (vph)	103	204	9	221	350	21	14	1207	176	18	1137	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	9	10	10
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98	1.00		0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1652	1406		3096		1595	3002	1205	1385	2852	
Flt Permitted		0.61	1.00		0.66		0.12	1.00	1.00	0.12	1.00	
Satd. Flow (perm)		1019	1406		2081		204	3002	1205	177	2852	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	108	215	9	233	368	22	15	1271	185	19	1197	108
RTOR Reduction (vph)	0	0	6	0	4	0	0	0	77	0	10	0
Lane Group Flow (vph)	0	323	3	0	619	0	15	1271	108	19	1295	0
Confl. Peds. (#/hr)	4		4	4		4	6		6	6		6
Heavy Vehicles (%)	0%	0%	0%	1%	0%	5%	0%	1%	0%	11%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		24.0	24.0		24.0		33.0	33.0	33.0	33.0	33.0	
Effective Green, g (s)		24.0	24.0		24.0		33.0	33.0	33.0	33.0	33.0	
Actuated g/C Ratio		0.37	0.37		0.37		0.51	0.51	0.51	0.51	0.51	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		376	519		768		103	1524	611	89	1447	
v/s Ratio Prot								0.42			c0.45	
v/s Ratio Perm		c0.32	0.00		0.30		0.07		0.09	0.11		
v/c Ratio		0.86	0.01		0.81		0.15	0.83	0.18	0.21	0.89	
Uniform Delay, d1		18.9	13.0		18.4		8.5	13.7	8.7	8.8	14.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.24	1.36	
Incremental Delay, d2		21.7	0.0		8.9		3.0	5.5	0.6	2.0	3.7	
Delay (s)		40.7	13.0		27.3		11.5	19.2	9.3	13.0	23.3	
Level of Service		D	B		C		B	B	A	B	C	
Approach Delay (s)		39.9			27.3			17.9			23.1	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1026: Ashland Ave. □ N Elston Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↑	↱	↰	↑↑		↰	↑↱	
Volume (vph)	21	286	70	0	494	218	115	1157	0	53	1037	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	10	14	14	10	10	10
Total Lost time (s)	4.0	4.0	4.0		4.0	3.0	4.0	4.0		3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1592	1647	1335		2020	1505	1596	3431		1596	2937	
Flt Permitted	0.13	1.00	1.00		1.00	1.00	0.13	1.00		0.12	1.00	
Satd. Flow (perm)	216	1647	1335		2020	1505	212	3431		204	2937	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	301	74	0	520	229	121	1218	0	56	1092	19
RTOR Reduction (vph)	0	0	52	0	0	30	0	0	0	0	1	0
Lane Group Flow (vph)	22	301	22	0	520	199	121	1218	0	56	1110	0
Confl. Peds. (#/hr)	8		9	9		8	1		3	3		1
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	1%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm		NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4		4			8	2			6		
Actuated Green, G (s)	31.0	31.0	31.0		31.0	39.0	55.0	55.0		41.0	41.0	
Effective Green, g (s)	31.0	31.0	31.0		31.0	39.0	55.0	55.0		41.0	41.0	
Actuated g/C Ratio	0.30	0.30	0.30		0.30	0.37	0.52	0.52		0.39	0.39	
Clearance Time (s)	4.0	4.0	4.0		4.0	3.0	4.0	4.0		3.0	3.0	
Lane Grp Cap (vph)	63	486	394		596	559	401	1797		185	1146	
v/s Ratio Prot		0.18			c0.26	0.03	0.06	c0.35		0.02	c0.38	
v/s Ratio Perm	0.10		0.02			0.11	0.09			0.09		
v/c Ratio	0.35	0.62	0.06		0.87	0.36	0.30	0.68		0.30	0.97	
Uniform Delay, d1	29.1	31.9	26.5		35.1	23.9	26.7	18.5		23.8	31.4	
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.70	0.61		1.00	1.00	
Incremental Delay, d2	14.6	5.8	0.3		16.1	1.8	1.2	1.3		4.2	20.0	
Delay (s)	43.7	37.7	26.8		51.3	25.7	19.8	12.5		28.0	51.4	
Level of Service	D	D	C		D	C	B	B		C	D	
Approach Delay (s)		36.0			43.4			13.1			50.2	
Approach LOS		D			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰			↰↑↱			↑↑	↱
Volume (vph)	449	286	29	3	412	0	46	746	3	0	946	332
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	10	10	10	11	11	10
Total Lost time (s)	3.0	5.0			5.0			4.0			4.0	3.0
Lane Util. Factor	1.00	1.00			1.00			0.91			0.95	1.00
Frpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	0.96
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	1.00
Frt	1.00	0.99			1.00			1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00			1.00			1.00	1.00
Satd. Flow (prot)	1636	1610			1980			4245			3210	1189
Flt Permitted	0.22	1.00			1.00			0.78			1.00	1.00
Satd. Flow (perm)	374	1610			1977			3325			3210	1189
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	473	301	31	3	434	0	48	785	3	0	996	349
RTOR Reduction (vph)	0	3	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	473	329	0	0	437	0	0	835	0	0	996	349
Confl. Peds. (#/hr)	6		5	5		6	15		12	12		15
Heavy Vehicles (%)	1%	3%	0%	0%	3%	0%	0%	3%	33%	0%	3%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	0	0
Parking (#/hr)								0				0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA			NA	custom
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2					1 6
Actuated Green, G (s)	53.0	53.0			29.0			38.0			43.0	43.0
Effective Green, g (s)	53.0	53.0			29.0			38.0			43.0	43.0
Actuated g/C Ratio	0.50	0.50			0.28			0.36			0.41	0.41
Clearance Time (s)	3.0	5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)	441	812			546			1203			1314	486
v/s Ratio Prot	c0.21	0.20									c0.31	
v/s Ratio Perm	c0.33				0.22			0.25				0.29
v/c Ratio	1.07	0.40			0.80			0.69			0.76	0.72
Uniform Delay, d1	24.6	16.2			35.3			28.6			26.5	25.9
Progression Factor	1.00	1.00			1.00			1.20			0.76	0.74
Incremental Delay, d2	63.6	1.5			11.7			2.5			2.4	5.3
Delay (s)	88.2	17.7			47.0			36.6			22.6	24.4
Level of Service	F	B			D			D			C	C
Approach Delay (s)		59.1			47.0			36.6			23.1	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	108.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✣			↑↱			↑↱	
Volume (vph)	2	181	16	111	259	9	4	835	120	0	982	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frpb, ped/bikes		1.00	0.97		1.00			0.95			0.99	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.99	
Flt Protected		1.00	1.00		0.99			1.00			1.00	
Satd. Flow (prot)		1698	1488		1699			2400			3010	
Flt Permitted		1.00	1.00		0.82			0.95			1.00	
Satd. Flow (perm)		1694	1488		1422			2284			3010	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2	191	17	117	273	9	4	879	126	0	1034	62
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	193	17	0	398	0	0	1009	0	0	1096	0
Confl. Peds. (#/hr)	62		8	8		62	24		125	125		24
Heavy Vehicles (%)	0%	6%	0%	5%	3%	0%	0%	2%	0%	0%	3%	2%
Parking (#/hr)								64			0	
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2					
Actuated Green, G (s)		43.0	43.0		43.0			53.0			53.0	
Effective Green, g (s)		43.0	43.0		43.0			53.0			53.0	
Actuated g/C Ratio		0.41	0.41		0.41			0.50			0.50	
Clearance Time (s)		5.0	5.0		5.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		693	609		582			1152			1519	
v/s Ratio Prot											0.36	
v/s Ratio Perm		0.11	0.01		c0.28			c0.44				
v/c Ratio		0.28	0.03		0.68			0.88			0.72	
Uniform Delay, d1		20.7	18.5		25.4			23.1			20.3	
Progression Factor		1.00	1.00		1.00			1.00			0.18	
Incremental Delay, d2		1.0	0.1		3.3			9.4			2.4	
Delay (s)		21.7	18.6		28.8			32.5			6.0	
Level of Service		C	B		C			C			A	
Approach Delay (s)		21.4			28.8			32.5			6.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	33	5	74	7	5	25	59	868	6	10	977	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	9	10	10	9
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.96			0.98		1.00	1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes		1.00			1.00		0.99	1.00	1.00	1.00	1.00	1.00
Frt		0.91			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1426			1475		1557	2743	1026	1330	2861	1052
Flt Permitted		0.89			0.95		0.26	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)		1287			1414		434	2743	1026	423	2861	1052
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	35	5	78	7	5	26	62	914	6	11	1028	12
RTOR Reduction (vph)	0	70	0	0	23	0	0	0	1	0	0	2
Lane Group Flow (vph)	0	48	0	0	15	0	62	914	5	11	1028	10
Confl. Peds. (#/hr)	6		15	15		6	8					8
Heavy Vehicles (%)	3%	0%	1%	0%	0%	0%	2%	3%	0%	20%	6%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.1			9.1		67.9	67.9	67.9	67.9	67.9	67.9
Effective Green, g (s)		9.1			9.1		67.9	67.9	67.9	67.9	67.9	67.9
Actuated g/C Ratio		0.11			0.11		0.80	0.80	0.80	0.80	0.80	0.80
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		5.0			5.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		137			151		346	2191	819	337	2285	840
v/s Ratio Prot								0.33			c0.36	
v/s Ratio Perm		c0.04			0.01		0.14		0.00	0.03		0.01
v/c Ratio		0.35			0.10		0.18	0.42	0.01	0.03	0.45	0.01
Uniform Delay, d1		35.2			34.2		2.0	2.6	1.7	1.8	2.7	1.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.3			0.6		1.1	0.6	0.0	0.2	0.6	0.0
Delay (s)		38.5			34.8		3.1	3.2	1.7	1.9	3.3	1.8
Level of Service		D			C		A	A	A	A	A	A
Approach Delay (s)		38.5			34.8			3.2			3.3	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1033: Ashland Ave. □ W North Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	88	453	57	131	465	33	127	993	199	121	956	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	10	10	10	10	10	10
Total Lost time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1466	2703		1500	2980		1596	2696	929	1492	2644	828
Flt Permitted	0.36	1.00		0.31	1.00		0.13	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	562	2703		492	2980		225	2696	929	187	2644	828
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	93	477	60	138	489	35	134	1045	209	127	1006	21
RTOR Reduction (vph)	0	10	0	0	5	0	0	0	52	0	0	13
Lane Group Flow (vph)	93	527	0	138	519	0	134	1045	157	127	1006	8
Confl. Peds. (#/hr)			48	48			20		21	21		20
Heavy Vehicles (%)	5%	12%	4%	2%	2%	6%	0%	3%	5%	7%	2%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	33.2	27.6		36.0	29.0		41.4	35.4	35.4	41.4	35.4	35.4
Effective Green, g (s)	33.2	27.6		36.0	29.0		41.4	35.4	35.4	41.4	35.4	35.4
Actuated g/C Ratio	0.37	0.31		0.40	0.32		0.46	0.39	0.39	0.46	0.39	0.39
Clearance Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	263	828		275	960		194	1060	365	173	1039	325
v/s Ratio Prot	0.02	c0.19		c0.04	0.17		0.05	c0.39		c0.05	0.38	
v/s Ratio Perm	0.11			0.16			0.27		0.17	0.29		0.01
v/c Ratio	0.35	0.64		0.50	0.54		0.69	0.99	0.43	0.73	0.97	0.03
Uniform Delay, d1	19.3	26.9		18.4	25.0		17.0	27.1	19.9	17.5	26.7	16.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	3.7		1.4	2.2		10.1	24.4	3.7	14.9	21.2	0.1
Delay (s)	20.2	30.6		19.8	27.2		27.2	51.5	23.6	32.4	48.0	16.9
Level of Service	C	C		B	C		C	D	C	C	D	B
Approach Delay (s)		29.0			25.7			45.0			45.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1039: Ashland Ave. □ W Blackhawk St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	15	40	5	33	25	66	13	1102	50	50	1097	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	9	10	10	9	10	10
Total Lost time (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		0.99	1.00		1.00	1.00	
Frt		0.99			0.93		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1922			1514		1409	2619		1507	2893	
Flt Permitted		0.94			0.93		0.15	1.00		0.14	1.00	
Satd. Flow (perm)		1834			1431		226	2619		226	2893	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	42	5	35	26	69	14	1160	53	53	1155	24
RTOR Reduction (vph)	0	3	0	0	38	0	0	5	0	0	2	0
Lane Group Flow (vph)	0	60	0	0	92	0	14	1208	0	53	1177	0
Confl. Peds. (#/hr)	18		38	38		18	47		5	5		47
Heavy Vehicles (%)	0%	2%	20%	6%	0%	2%	8%	1%	0%	2%	1%	0%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			24.0		35.0	35.0		35.0	35.0	
Effective Green, g (s)		24.0			24.0		35.0	35.0		35.0	35.0	
Actuated g/C Ratio		0.37			0.37		0.54	0.54		0.54	0.54	
Clearance Time (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		677			528		121	1410		121	1557	
v/s Ratio Prot								c0.46			0.41	
v/s Ratio Perm		0.03			c0.06		0.06			0.23		
v/c Ratio		0.09			0.17		0.12	0.86		0.44	0.76	
Uniform Delay, d1		13.4			13.8		7.4	12.9		9.1	11.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.7		1.9	6.9		11.1	3.5	
Delay (s)		13.6			14.5		9.3	19.7		20.2	15.1	
Level of Service		B			B		A	B		C	B	
Approach Delay (s)		13.6			14.5			19.6			15.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1042: Ashland Ave. □ N Milwaukee Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↑	↱	↰	↑↑	↱	↰	↑↱	
Volume (vph)	26	237	73	0	340	77	79	805	3	20	1142	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	10	10	8	10	12	12
Total Lost time (s)	5.0	5.0			5.0	3.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.95	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	0.98	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1497	1595			1706	1395	1580	3129	1155	1277	3184	
Flt Permitted	0.54	1.00			1.00	1.00	0.11	1.00	1.00	0.31	1.00	
Satd. Flow (perm)	858	1595			1706	1395	175	3129	1155	417	3184	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	249	77	0	358	81	83	847	3	21	1202	3
RTOR Reduction (vph)	0	12	0	0	0	39	0	0	2	0	0	0
Lane Group Flow (vph)	27	314	0	0	358	42	83	847	1	21	1205	0
Confl. Peds. (#/hr)	49		18	18		49	5					5
Heavy Vehicles (%)	4%	5%	3%	0%	2%	1%	1%	2%	0%	25%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4					3 8	2		2	6		
Actuated Green, G (s)	29.0	29.0			37.0	37.0	43.0	43.0	43.0	35.0	35.0	
Effective Green, g (s)	29.0	29.0			37.0	37.0	43.0	43.0	43.0	35.0	35.0	
Actuated g/C Ratio	0.32	0.32			0.41	0.41	0.48	0.48	0.48	0.39	0.39	
Clearance Time (s)	5.0	5.0			5.0		3.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	276	513			701	573	161	1494	551	162	1238	
v/s Ratio Prot		c0.20			c0.21		0.03	c0.27			c0.38	
v/s Ratio Perm	0.03					0.03	0.22		0.00	0.05		
v/c Ratio	0.10	0.61			0.51	0.07	0.52	0.57	0.00	0.13	0.97	
Uniform Delay, d1	21.3	25.7			19.8	16.1	17.9	16.8	12.3	17.7	27.0	
Progression Factor	1.00	1.00			1.00	1.00	0.68	0.50	1.00	1.00	1.00	
Incremental Delay, d2	0.7	5.4			2.6	0.2	9.7	1.3	0.0	1.6	19.9	
Delay (s)	22.1	31.1			22.4	16.3	21.9	9.8	12.3	19.3	47.0	
Level of Service	C	C			C	B	C	A	B	B	D	
Approach Delay (s)		30.4			21.3			10.9			46.5	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1043: Ashland Ave. □ W Division St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑↱			↑↑	↱
Volume (vph)	98	408	29	231	566	15	91	920	168	5	976	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	9	11	9	11	11	9
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91			0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.86	1.00	1.00	0.81	1.00	0.96			1.00	0.71
Flpb, ped/bikes	0.92	1.00	1.00	0.98	1.00	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1511	3179	1266	1616	3160	1164	1534	4195			3108	851
Flt Permitted	0.43	1.00	1.00	0.38	1.00	1.00	0.13	1.00			0.95	1.00
Satd. Flow (perm)	679	3179	1266	643	3160	1164	205	4195			2950	851
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	429	31	243	596	16	96	968	177	5	1027	153
RTOR Reduction (vph)	0	0	22	0	0	10	0	29	0	0	0	58
Lane Group Flow (vph)	103	429	9	243	596	6	96	1116	0	0	1032	95
Confl. Peds. (#/hr)	169		130	130		169	272		244	244		272
Confl. Bikes (#/hr)						3						5
Heavy Vehicles (%)	1%	4%	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	26.0	26.0	26.0	36.0	36.0	36.0	44.0	44.0			36.2	36.2
Effective Green, g (s)	26.0	26.0	26.0	36.0	36.0	36.0	44.0	44.0			36.2	36.2
Actuated g/C Ratio	0.29	0.29	0.29	0.40	0.40	0.40	0.49	0.49			0.40	0.40
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	196	918	365	332	1264	465	171	2050			1186	342
v/s Ratio Prot		0.13		c0.06	0.19		0.03	c0.27				
v/s Ratio Perm	0.15		0.01	c0.24		0.01	0.24				c0.35	0.11
v/c Ratio	0.53	0.47	0.02	0.73	0.47	0.01	0.56	0.54			0.87	0.28
Uniform Delay, d1	26.8	26.3	22.9	21.3	20.0	16.3	15.7	16.0			24.7	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.87	1.26
Incremental Delay, d2	9.7	1.7	0.1	13.3	1.3	0.1	4.2	1.0			3.1	0.6
Delay (s)	36.6	28.0	23.0	34.7	21.2	16.3	19.9	17.1			24.5	23.4
Level of Service	D	C	C	C	C	B	B	B			C	C
Approach Delay (s)		29.3			25.0			17.3			24.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	113	244	58	69	467	59	78	1047	34	30	1003	131
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	10	10	10	10	10	10
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1573	1671		1520	1663	1342	1594	2793		1580	2638	
Flt Permitted	0.25	1.00		0.44	1.00	1.00	0.14	1.00		0.16	1.00	
Satd. Flow (perm)	415	1671		705	1663	1342	237	2793		263	2638	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	257	61	73	492	62	82	1102	36	32	1056	138
RTOR Reduction (vph)	0	13	0	0	0	32	0	3	0	0	16	0
Lane Group Flow (vph)	119	305	0	73	492	30	82	1135	0	32	1178	0
Confl. Peds. (#/hr)	14		5	5		14	6		37	37		6
Heavy Vehicles (%)	1%	1%	0%	1%	1%	0%	0%	2%	3%	0%	4%	1%
Parking (#/hr)								20			30	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0	25.0	34.0	34.0		34.0	34.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0	25.0	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.52	0.52		0.52	0.52	
Clearance Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	159	642		271	639	516	123	1460		137	1379	
v/s Ratio Prot		0.18			c0.30			0.41			c0.45	
v/s Ratio Perm	0.29			0.10		0.02	0.35			0.12		
v/c Ratio	0.75	0.48		0.27	0.77	0.06	0.67	0.78		0.23	0.85	
Uniform Delay, d1	17.3	15.1		13.7	17.5	12.6	11.4	12.5		8.4	13.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.2	2.5		2.4	8.7	0.2	25.1	4.1		4.0	6.9	
Delay (s)	44.4	17.6		16.2	26.2	12.8	36.4	16.6		12.4	20.3	
Level of Service	D	B		B	C	B	D	B		B	C	
Approach Delay (s)		24.9			23.7			17.9			20.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	71	422	72	28	611	32	103	997	81	53	709	203
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	10	10	10	10	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1646	3210		1624	3246		1595	2834		1594	2973	
Flt Permitted	0.29	1.00		0.39	1.00		0.14	1.00		0.12	1.00	
Satd. Flow (perm)	500	3210		659	3246		234	2834		203	2973	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	75	444	76	29	643	34	108	1049	85	56	746	214
RTOR Reduction (vph)	0	17	0	0	4	0	0	6	0	0	29	0
Lane Group Flow (vph)	75	503	0	29	673	0	108	1128	0	56	931	0
Confl. Peds. (#/hr)	16		50	50		16	38		121	121		38
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	1%	1%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		43.8	35.8		38.2	33.0	
Effective Green, g (s)	33.0	33.0		33.0	33.0		43.8	35.8		38.2	33.0	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.52	0.42		0.45	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	3.0		4.0	3.0	
Lane Grp Cap (vph)	194	1246		255	1260		248	1193		176	1154	
v/s Ratio Prot		0.16			c0.21		c0.04	c0.40		0.02	0.31	
v/s Ratio Perm	0.15			0.04			0.18			0.12		
v/c Ratio	0.39	0.40		0.11	0.53		0.44	0.95		0.32	0.81	
Uniform Delay, d1	18.7	18.9		16.6	20.1		13.4	23.7		15.4	23.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.7	1.0		0.9	1.6		1.7	15.8		1.4	6.1	
Delay (s)	24.4	19.8		17.5	21.7		15.1	39.5		16.9	29.3	
Level of Service	C	B		B	C		B	D		B	C	
Approach Delay (s)		20.4			21.5			37.4			28.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1062: Ashland Ave. □ W Erie St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	37	20	25	13	38	23	50	1258	14	27	894	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)		5.0			5.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.99			0.99		1.00	1.00	0.94	1.00	1.00	0.95
Flpb, ped/bikes		1.00			1.00		0.99	1.00	1.00	1.00	1.00	1.00
Frt		0.96			0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1533			1578		1588	2923	1104	1596	2863	1049
Flt Permitted		0.86			0.95		0.26	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)		1341			1516		432	2923	1104	250	2863	1049
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	39	21	26	14	40	24	53	1324	15	28	941	29
RTOR Reduction (vph)	0	17	0	0	18	0	0	0	5	0	0	8
Lane Group Flow (vph)	0	69	0	0	60	0	53	1324	10	28	941	21
Confl. Peds. (#/hr)	8		16	16		8	8		11	11		8
Heavy Vehicles (%)	0%	5%	0%	0%	0%	0%	0%	1%	0%	0%	2%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		23.0			23.0		59.0	59.0	59.0	59.0	59.0	59.0
Effective Green, g (s)		23.0			23.0		59.0	59.0	59.0	59.0	59.0	59.0
Actuated g/C Ratio		0.26			0.26		0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)		5.0			5.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		342			387		283	1916	723	163	1876	687
v/s Ratio Prot								c0.45			0.33	
v/s Ratio Perm		c0.05			0.04		0.12		0.01	0.11		0.02
v/c Ratio		0.20			0.16		0.19	0.69	0.01	0.17	0.50	0.03
Uniform Delay, d1		26.3			26.0		6.1	9.8	5.4	6.0	8.0	5.4
Progression Factor		1.00			1.00		0.57	0.47	0.14	1.00	1.00	1.00
Incremental Delay, d2		1.3			0.9		0.8	1.2	0.0	2.3	1.0	0.1
Delay (s)		27.6			26.8		4.3	5.8	0.8	8.3	8.9	5.5
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		27.6			26.8			5.7			8.8	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1066: Ashland Ave. □ W Grand Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↑	↱
Volume (vph)	149	475	75	65	512	104	170	994	50	58	682	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	3.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	0.89
Flpb, ped/bikes	1.00	1.00		0.96	1.00		0.96	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1580	3001		1529	3026		1521	2865		1596	2973	1106
Flt Permitted	0.23	1.00		0.43	1.00		0.38	1.00		0.10	1.00	1.00
Satd. Flow (perm)	381	3001		699	3026		607	2865		170	2973	1106
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	500	79	68	539	109	179	1046	53	61	718	54
RTOR Reduction (vph)	0	14	0	0	19	0	0	4	0	0	0	24
Lane Group Flow (vph)	157	565	0	68	629	0	179	1095	0	61	718	30
Confl. Peds. (#/hr)	5		69	69		5	56		23	23		56
Heavy Vehicles (%)	1%	3%	1%	0%	3%	0%	1%	1%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	37.0	37.0		28.0	28.0		36.5	36.5		45.0	45.0	45.0
Effective Green, g (s)	37.0	37.0		28.0	28.0		36.5	36.5		45.0	45.0	45.0
Actuated g/C Ratio	0.41	0.41		0.31	0.31		0.41	0.41		0.50	0.50	0.50
Clearance Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	236	1233		217	941		246	1161		172	1486	553
v/s Ratio Prot	c0.04	0.19			0.21			c0.38		0.02	c0.24	
v/s Ratio Perm	c0.23			0.10			0.30			0.16		0.03
v/c Ratio	0.67	0.46		0.31	0.67		0.73	0.94		0.35	0.48	0.05
Uniform Delay, d1	18.6	19.2		23.7	27.0		22.6	25.7		15.5	14.8	11.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.62	1.04	1.45
Incremental Delay, d2	6.9	1.2		3.7	3.8		17.1	15.9		1.1	1.0	0.2
Delay (s)	25.5	20.5		27.4	30.7		39.7	41.6		26.3	16.5	17.0
Level of Service	C	C		C	C		D	D		C	B	B
Approach Delay (s)		21.5			30.4			41.3			17.2	
Approach LOS		C			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. □ W Fulton St. (West)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	⑂		↰	↑↑	↑↱	
Volume (vph)	49	55	0	1010	1032	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	0.99			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.93			1.00	1.00	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1485			3079	3011	
Flt Permitted	0.98			1.00	1.00	
Satd. Flow (perm)	1485			3079	3011	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	52	58	0	1063	1086	20
RTOR Reduction (vph)	45	0	0	0	1	0
Lane Group Flow (vph)	65	0	0	1063	1105	0
Confl. Peds. (#/hr)	18	3				
Heavy Vehicles (%)	0%	9%	0%	2%	4%	5%
Parking (#/hr)				0	0	
Turn Type	NA		custom	NA	NA	
Protected Phases	4		5 10	2 10	6	
Permitted Phases			2			
Actuated Green, G (s)	19.0			57.0	49.0	
Effective Green, g (s)	19.0			57.0	49.0	
Actuated g/C Ratio	0.21			0.63	0.54	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	313			1950	1639	
v/s Ratio Prot	c0.04			c0.35	c0.37	
v/s Ratio Perm						
v/c Ratio	0.21			0.55	0.67	
Uniform Delay, d1	29.3			9.2	14.8	
Progression Factor	1.00			0.07	1.00	
Incremental Delay, d2	1.5			0.8	2.2	
Delay (s)	30.8			1.5	17.0	
Level of Service	C			A	B	
Approach Delay (s)	30.8			1.5	17.0	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1074: Ashland Ave. □ W Fulton St. (East)

8/8/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱		↰	↑↑
Volume (vph)	26	61	1010	10	25	1032
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10
Total Lost time (s)	3.0		3.0		2.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.92		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		1.00		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1291		2966		1478	2854
Flt Permitted	0.99		1.00		0.18	1.00
Satd. Flow (perm)	1291		2966		281	2854
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	64	1063	11	26	1086
RTOR Reduction (vph)	50	0	1	0	0	0
Lane Group Flow (vph)	41	0	1073	0	26	1086
Confl. Peds. (#/hr)	3	18				
Heavy Vehicles (%)	8%	7%	2%	10%	8%	4%
Parking (#/hr)			0			8
Turn Type	NA		NA		custom	NA
Protected Phases	8		2		1 14	6 14
Permitted Phases					6	
Actuated Green, G (s)	19.0		49.0		60.0	57.0
Effective Green, g (s)	19.0		49.0		60.0	57.0
Actuated g/C Ratio	0.21		0.54		0.67	0.63
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	272		1614		333	1807
v/s Ratio Prot	c0.03		c0.36		c0.01	c0.38
v/s Ratio Perm					0.04	
v/c Ratio	0.15		0.66		0.08	0.60
Uniform Delay, d1	28.9		14.6		6.6	9.8
Progression Factor	1.00		0.17		0.15	0.07
Incremental Delay, d2	1.2		1.9		0.3	1.1
Delay (s)	30.1		4.4		1.3	1.8
Level of Service	C		A		A	A
Approach Delay (s)	30.1		4.4			1.8
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	27	201	31	33	269	89	17	814	37	70	748	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	10	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes		0.99			0.99		1.00	1.00	0.83	1.00	1.00	0.68
Flpb, ped/bikes		1.00			1.00		0.92	1.00	1.00	0.97	1.00	1.00
Frt		0.98			0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1717			1695		1472	2718	822	1542	3099	938
Flt Permitted		0.91			0.96		0.31	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)		1570			1629		488	2718	822	465	3099	938
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	212	33	35	283	94	18	857	39	74	787	42
RTOR Reduction (vph)	0	6	0	0	12	0	0	0	15	0	0	16
Lane Group Flow (vph)	0	267	0	0	400	0	18	857	24	74	787	26
Confl. Peds. (#/hr)	27		52	52		27	88		45	45		88
Confl. Bikes (#/hr)			2						2			
Heavy Vehicles (%)	0%	2%	0%	0%	1%	2%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		26.0			26.0		56.0	56.0	56.0	56.0	56.0	56.0
Effective Green, g (s)		26.0			26.0		56.0	56.0	56.0	56.0	56.0	56.0
Actuated g/C Ratio		0.29			0.29		0.62	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)		453			470		303	1691	511	289	1928	583
v/s Ratio Prot								c0.32			0.25	
v/s Ratio Perm		0.17			c0.25		0.04		0.03	0.16		0.03
v/c Ratio		0.59			0.85		0.06	0.51	0.05	0.26	0.41	0.04
Uniform Delay, d1		27.4			30.2		6.7	9.4	6.6	7.6	8.6	6.6
Progression Factor		1.00			1.00		0.68	0.88	0.75	0.29	0.27	0.06
Incremental Delay, d2		5.6			17.4		0.4	1.0	0.2	1.7	0.5	0.1
Delay (s)		33.0			47.5		4.9	9.2	5.2	3.9	2.9	0.5
Level of Service		C			D		A	A	A	A	A	A
Approach Delay (s)		33.0			47.5			9.0			2.8	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1079: Ashland Ave. □ W Washington Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱	↰	↑↑↑			↑↑↱	
Volume (vph)	0	0	0	19	241	20	26	1001	0	0	964	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.91	
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	
Flpb, ped/bikes				0.99	1.00	1.00	0.99	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.99	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1511	3160	1403	1630	4502			4209	
Flt Permitted				0.95	1.00	1.00	0.23	1.00			1.00	
Satd. Flow (perm)				1511	3160	1403	392	4502			4209	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	20	254	21	27	1054	0	0	1015	61
RTOR Reduction (vph)	0	0	0	0	0	15	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	0	20	254	6	27	1054	0	0	1069	0
Confl. Peds. (#/hr)	5		5	5		5	44		27	27		44
Confl. Bikes (#/hr)			2						1			1
Heavy Vehicles (%)	0%	0%	0%	5%	1%	0%	0%	2%	0%	0%	3%	0%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)				26.0	26.0	26.0	56.0	56.0			56.0	
Effective Green, g (s)				26.0	26.0	26.0	56.0	56.0			56.0	
Actuated g/C Ratio				0.29	0.29	0.29	0.62	0.62			0.62	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Grp Cap (vph)				436	912	405	243	2801			2618	
v/s Ratio Prot					c0.08			0.23			c0.25	
v/s Ratio Perm				0.01		0.00	0.07					
v/c Ratio				0.05	0.28	0.01	0.11	0.38			0.41	
Uniform Delay, d1				23.1	24.7	22.9	6.9	8.4			8.6	
Progression Factor				1.00	1.00	1.00	0.28	0.25			1.20	
Incremental Delay, d2				0.2	0.8	0.1	0.9	0.4			0.5	
Delay (s)				23.3	25.5	22.9	2.8	2.5			10.8	
Level of Service				C	C	C	A	A			B	
Approach Delay (s)		0.0			25.2			2.5			10.8	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1080: Ashland Ave. □ W Warren Blvd.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↑↱		↰	↑↑↑	
Volume (vph)	42	194	41	0	0	0	0	1005	2	33	865	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		1.00	0.91	
Frpb, ped/bikes		1.00						1.00		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		0.98						1.00		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		2951						4047		1479	3888	
Flt Permitted		0.99						1.00		0.23	1.00	
Satd. Flow (perm)		2951						4047		363	3888	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	204	43	0	0	0	0	1058	2	35	911	0
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	275	0	0	0	0	0	1060	0	35	911	0
Confl. Peds. (#/hr)			2	2			30		19	19		30
Confl. Bikes (#/hr)									3			3
Heavy Vehicles (%)	0%	1%	2%	0%	0%	0%	0%	2%	50%	0%	3%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		26.0						56.0		56.0	56.0	
Effective Green, g (s)		26.0						56.0		56.0	56.0	
Actuated g/C Ratio		0.29						0.62		0.62	0.62	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Lane Grp Cap (vph)		852						2518		225	2419	
v/s Ratio Prot								c0.26			0.23	
v/s Ratio Perm		0.09								0.10		
v/c Ratio		0.32						0.42		0.16	0.38	
Uniform Delay, d1		25.1						8.7		7.1	8.4	
Progression Factor		1.00						0.33		0.14	0.12	
Incremental Delay, d2		1.0						0.5		1.4	0.4	
Delay (s)		26.1						3.3		2.4	1.4	
Level of Service		C						A		A	A	
Approach Delay (s)		26.1			0.0			3.3			1.5	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑↱		↰	↑↑↱	
Volume (vph)	44	307	42	14	414	104	31	876	8	70	819	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.97	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1535	2965		1546	2969		1638	4539		1640	4399	
Flt Permitted	0.45	1.00		0.33	1.00		0.21	1.00		0.21	1.00	
Satd. Flow (perm)	725	2965		534	2969		370	4539		366	4399	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	46	323	44	15	436	109	33	922	8	74	862	61
RTOR Reduction (vph)	0	12	0	0	14	0	0	1	0	0	9	0
Lane Group Flow (vph)	46	355	0	15	531	0	33	929	0	74	914	0
Confl. Peds. (#/hr)	31		74	74		31	27		23	23		27
Confl. Bikes (#/hr)						3			1			2
Heavy Vehicles (%)	2%	5%	0%	0%	4%	0%	0%	1%	0%	0%	3%	2%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8			2			6		
Actuated Green, G (s)	33.0	33.0		49.0	49.0		33.0	33.0		33.0	33.0	
Effective Green, g (s)	33.0	33.0		49.0	49.0		33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.37	0.37		0.54	0.54		0.37	0.37		0.37	0.37	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	265	1087		290	1616		135	1664		134	1612	
v/s Ratio Prot		0.12			c0.18			0.20			c0.21	
v/s Ratio Perm	0.06			0.03			0.09			0.20		
v/c Ratio	0.17	0.33		0.05	0.33		0.24	0.56		0.55	0.57	
Uniform Delay, d1	19.3	20.5		9.6	11.4		19.8	22.7		22.6	22.8	
Progression Factor	1.00	1.00		1.00	1.00		0.66	0.74		0.43	0.36	
Incremental Delay, d2	1.4	0.8		0.3	0.5		3.6	1.1		14.7	1.4	
Delay (s)	20.7	21.3		9.9	11.9		16.6	17.8		24.4	9.6	
Level of Service	C	C		A	B		B	B		C	A	
Approach Delay (s)		21.2			11.9			17.8			10.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1083: Ashland Ave. □ W Ogden Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑		↰	↑↑			↑↑	↱		↑↑↱	
Volume (vph)	173	742	0	204	640	0	0	742	335	0	723	152
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95	1.00		0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1708	3353		1636	3241			3241	1300		4267	
Flt Permitted	0.40	1.00		0.15	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	711	3353		253	3241			3241	1300		4267	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	182	781	0	215	674	0	0	781	353	0	761	160
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	13	0	36	0
Lane Group Flow (vph)	182	781	0	215	674	0	0	781	340	0	885	0
Confl. Peds. (#/hr)	3		7	7		3	22		13	13		22
Confl. Bikes (#/hr)			1			3			3			5
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	0%	2%	0%	0%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	8	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA	pm+ov		NA	
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4			8					2			
Actuated Green, G (s)	27.0	27.0		38.0	38.0			44.0	52.0		44.0	
Effective Green, g (s)	27.0	27.0		38.0	38.0			44.0	52.0		44.0	
Actuated g/C Ratio	0.30	0.30		0.42	0.42			0.49	0.58		0.49	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0	3.0		4.0	
Lane Grp Cap (vph)	213	1005		229	1368			1584	751		2086	
v/s Ratio Prot		0.23		c0.08	0.21			c0.24	0.04		0.21	
v/s Ratio Perm	0.26			c0.31					0.22			
v/c Ratio	0.85	0.78		0.94	0.49			0.49	0.45		0.42	
Uniform Delay, d1	29.7	28.8		20.0	19.0			15.5	10.9		14.8	
Progression Factor	1.00	1.00		1.00	1.00			1.61	1.11		0.30	
Incremental Delay, d2	33.0	5.9		45.5	1.3			0.9	1.6		0.5	
Delay (s)	62.6	34.7		65.4	20.2			25.8	13.7		5.0	
Level of Service	E	C		E	C			C	B		A	
Approach Delay (s)		39.9			31.2			22.1			5.0	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	1	50	33	51	51	20	27	1067	40	29	811	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		0.98	1.00		0.99	1.00	
Frt		0.95			0.98		1.00	0.99		1.00	1.00	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1566			1577		1571	2760		1586	2914	
Flt Permitted		1.00			0.87		0.31	1.00		0.21	1.00	
Satd. Flow (perm)		1564			1400		507	2760		346	2914	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	53	35	54	54	21	28	1123	42	31	854	2
RTOR Reduction (vph)	0	26	0	0	8	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	63	0	0	121	0	28	1162	0	31	856	0
Confl. Peds. (#/hr)	7		17	17		7	18		15	15		18
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	2%	5%	0%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.0			18.0		64.0	64.0		64.0	64.0	
Effective Green, g (s)		18.0			18.0		64.0	64.0		64.0	64.0	
Actuated g/C Ratio		0.20			0.20		0.71	0.71		0.71	0.71	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		312			280		360	1962		246	2072	
v/s Ratio Prot								c0.42			0.29	
v/s Ratio Perm		0.04			c0.09		0.06			0.09		
v/c Ratio		0.20			0.43		0.08	0.59		0.13	0.41	
Uniform Delay, d1		30.0			31.5		4.0	6.5		4.1	5.3	
Progression Factor		1.00			1.00		1.01	0.60		0.26	0.25	
Incremental Delay, d2		1.5			4.8		0.3	1.0		0.9	0.5	
Delay (s)		31.5			36.3		4.3	4.9		2.0	1.8	
Level of Service		C			D		A	A		A	A	
Approach Delay (s)		31.5			36.3			4.9			1.8	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1085: Ashland Ave. □ W Adams St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱		↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	69	144	83	55	1048	0	0	878	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		1.00	0.95			0.95	1.00
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.92
Flpb, ped/bikes					1.00		0.99	1.00			1.00	1.00
Frt					0.96		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					2927		1600	2642			2953	1085
Flt Permitted					0.99		0.26	1.00			1.00	1.00
Satd. Flow (perm)					2927		436	2642			2953	1085
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	73	152	87	58	1103	0	0	924	69
RTOR Reduction (vph)	0	0	0	0	46	0	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	0	267	0	58	1103	0	0	924	42
Confl. Peds. (#/hr)	32		8	8		32	33		17	17		33
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	2%	1%	2%	2%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								54			12	12
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					27.0		55.0	55.0			55.0	55.0
Effective Green, g (s)					27.0		55.0	55.0			55.0	55.0
Actuated g/C Ratio					0.30		0.61	0.61			0.61	0.61
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					878		266	1614			1804	663
v/s Ratio Prot								c0.42			0.31	
v/s Ratio Perm					0.09		0.13					0.04
v/c Ratio					0.30		0.22	0.68			0.51	0.06
Uniform Delay, d1					24.3		7.9	11.7			9.9	7.1
Progression Factor					1.00		2.31	2.31			0.51	0.47
Incremental Delay, d2					0.9		1.6	2.0			1.0	0.2
Delay (s)					25.1		19.7	29.0			6.1	3.5
Level of Service					C		B	C			A	A
Approach Delay (s)		0.0			25.1			28.5			5.9	
Approach LOS		A			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1086: Ashland Ave. □ W Jackson Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↑	↱	↰	↑↑	
Volume (vph)	62	227	105	0	0	0	0	1036	136	55	690	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	0.97					1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3301	1477					3241	1227	1646	2889	
Flt Permitted		0.99	1.00					1.00	1.00	0.20	1.00	
Satd. Flow (perm)		3301	1477					3241	1227	340	2889	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	239	111	0	0	0	0	1091	143	58	726	0
RTOR Reduction (vph)	0	0	76	0	0	0	0	0	59	0	0	0
Lane Group Flow (vph)	0	304	35	0	0	0	0	1091	84	58	726	0
Confl. Peds. (#/hr)	6		13	13		6			20	20		9
Heavy Vehicles (%)	0%	3%	1%	0%	0%	0%	2%	2%	1%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		28.0	28.0					53.0	53.0	53.0	53.0	
Effective Green, g (s)		28.0	28.0					53.0	53.0	53.0	53.0	
Actuated g/C Ratio		0.31	0.31					0.59	0.59	0.59	0.59	
Clearance Time (s)		5.0	5.0					4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)		1026	459					1908	722	200	1701	
v/s Ratio Prot								c0.34			0.25	
v/s Ratio Perm		0.09	0.02						0.07	0.17		
v/c Ratio		0.30	0.08					0.57	0.12	0.29	0.43	
Uniform Delay, d1		23.5	21.9					11.5	8.2	9.2	10.2	
Progression Factor		1.00	1.00					1.00	1.00	1.64	1.68	
Incremental Delay, d2		0.7	0.3					1.3	0.3	3.2	0.7	
Delay (s)		24.3	22.2					12.7	8.5	18.3	17.7	
Level of Service		C	C					B	A	B	B	
Approach Delay (s)		23.7			0.0			12.2			17.8	
Approach LOS		C			A			B			B	

Intersection Summary

HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1088: Ashland Ave. □ W Van Buren St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱	↰	↰↑↑			↑↑↱	
Volume (vph)	0	0	0	292	340	185	362	861	0	0	938	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	10	10	10	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	0.86	0.86			0.91	
Frpb, ped/bikes				1.00	1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	1.00	1.00	0.95	0.99			1.00	
Satd. Flow (prot)				1621	3179	1399	1346	4077			4339	
Flt Permitted				0.95	1.00	1.00	0.18	0.65			1.00	
Satd. Flow (perm)				1621	3179	1399	256	2690			4339	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	307	358	195	381	906	0	0	987	165
RTOR Reduction (vph)	0	0	0	0	0	118	0	0	0	0	23	0
Lane Group Flow (vph)	0	0	0	307	358	77	221	1066	0	0	1129	0
Confl. Peds. (#/hr)	8					8	15		9	9		15
Confl. Bikes (#/hr)						3			1			9
Heavy Vehicles (%)	0%	0%	0%	2%	4%	3%	2%	2%	0%	0%	3%	1%
Parking (#/hr)								0			0	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)				29.0	29.0	29.0	63.0	63.0			48.0	
Effective Green, g (s)				29.0	29.0	29.0	63.0	63.0			48.0	
Actuated g/C Ratio				0.29	0.29	0.29	0.63	0.63			0.48	
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Grp Cap (vph)				470	921	405	281	1847			2082	
v/s Ratio Prot					0.11		c0.09	0.06			0.26	
v/s Ratio Perm				c0.19		0.06	c0.41	0.30				
v/c Ratio				0.65	0.39	0.19	0.79	0.58			0.54	
Uniform Delay, d1				31.1	28.4	26.7	22.8	10.8			18.3	
Progression Factor				1.00	1.00	1.00	0.73	0.35			1.00	
Incremental Delay, d2				6.9	1.2	1.0	13.9	0.9			1.0	
Delay (s)				38.0	29.6	27.7	30.5	4.7			19.3	
Level of Service				D	C	C	C	A			B	
Approach Delay (s)		0.0			32.2			9.1			19.3	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1089: Ashland Ave. □ W Congress Pkwy

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↑↱		↰	↑↑↑	
Volume (vph)	193	267	258	0	0	0	0	1030	471	152	1078	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	10	10	10
Total Lost time (s)		6.0	6.0					4.0		6.0	6.0	
Lane Util. Factor		0.95	1.00					0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3289	1471					4234		1580	4258	
Flt Permitted		0.98	1.00					1.00		0.09	1.00	
Satd. Flow (perm)		3289	1471					4234		149	4258	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	203	281	272	0	0	0	0	1084	496	160	1135	0
RTOR Reduction (vph)	0	0	74	0	0	0	0	83	0	0	0	0
Lane Group Flow (vph)	0	484	198	0	0	0	0	1497	0	160	1135	0
Confl. Peds. (#/hr)							2		3	3		2
Heavy Vehicles (%)	3%	1%	4%	0%	0%	0%	0%	2%	1%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm					NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		25.0	25.0					48.0		63.0	63.0	
Effective Green, g (s)		25.0	25.0					48.0		63.0	63.0	
Actuated g/C Ratio		0.25	0.25					0.48		0.63	0.63	
Clearance Time (s)		6.0	6.0					4.0		6.0	6.0	
Lane Grp Cap (vph)		822	367					2032		251	2682	
v/s Ratio Prot								c0.35		c0.07	0.27	
v/s Ratio Perm		0.15	0.13							0.33		
v/c Ratio		0.59	0.54					0.74		0.64	0.42	
Uniform Delay, d1		33.0	32.5					20.9		26.7	9.3	
Progression Factor		1.00	1.00					0.38		0.76	0.36	
Incremental Delay, d2		3.1	5.6					1.8		9.8	0.4	
Delay (s)		36.1	38.1					9.7		30.3	3.7	
Level of Service		D	D					A		C	A	
Approach Delay (s)		36.8			0.0			9.7			7.0	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1090: Ashland Ave. □ W Harrison St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↑↱		↰	↑↑↱		↰	↑↑↑↱		↰	↑↑↑↱	
Volume (vph)	280	307	121	61	163	54	33	1447	127	53	1145	154
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.96	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1489	2948		1525	2875		1601	4421		1616	4316	
Flt Permitted	0.50	0.89		0.45	1.00		0.14	1.00		0.09	1.00	
Satd. Flow (perm)	778	2637		728	2875		244	4421		157	4316	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	323	127	64	172	57	35	1523	134	56	1205	162
RTOR Reduction (vph)	0	30	0	0	32	0	0	10	0	0	17	0
Lane Group Flow (vph)	233	482	0	64	197	0	35	1647	0	56	1350	0
Confl. Peds. (#/hr)	29		84	84		29	18		36	36		18
Confl. Bikes (#/hr)			1			2			3			1
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	3%	1%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0		18.0	18.0		55.0	55.0		55.0	55.0	
Effective Green, g (s)	35.0	35.0		18.0	18.0		55.0	55.0		55.0	55.0	
Actuated g/C Ratio	0.35	0.35		0.18	0.18		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	371	966		131	517		134	2431		86	2373	
v/s Ratio Prot	c0.09	0.07			0.07			c0.37			0.31	
v/s Ratio Perm	c0.13	0.10		0.09			0.14			0.36		
v/c Ratio	0.63	0.50		0.49	0.38		0.26	0.68		0.65	0.57	
Uniform Delay, d1	25.1	25.6		36.9	36.1		11.8	16.1		15.8	14.7	
Progression Factor	1.00	1.00		1.00	1.00		0.62	0.58		0.52	0.45	
Incremental Delay, d2	7.8	1.8		12.5	2.1		4.3	1.4		29.8	0.9	
Delay (s)	33.0	27.4		49.3	38.2		11.5	10.8		37.9	7.5	
Level of Service	C	C		D	D		B	B		D	A	
Approach Delay (s)		29.2			40.6			10.8			8.7	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1091: Ashland Ave. □ W Flourney St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✥		↰	↑↑↱			↑↑↱	
Volume (vph)	361	0	91	0	1	4	30	1186	6	2	1195	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0		4.0	4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00		1.00	0.91			0.91	
Frpb, ped/bikes	1.00		0.98		0.99		1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00		1.00		1.00	1.00			1.00	
Frt	1.00		0.85		0.89		1.00	1.00			1.00	
Flt Protected	0.95		1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)	3086		1401		1586		1646	4454			4482	
Flt Permitted	0.75		1.00		1.00		0.18	1.00			0.94	
Satd. Flow (perm)	2451		1401		1586		305	4454			4208	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	380	0	96	0	1	4	32	1248	6	2	1258	31
RTOR Reduction (vph)	0	0	58	0	3	0	0	0	0	0	2	0
Lane Group Flow (vph)	380	0	38	0	2	0	32	1254	0	0	1289	0
Confl. Peds. (#/hr)	3		6	6		3	11		18	18		11
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA		Perm	NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	26.0		26.0		26.0		65.0	65.0			65.0	
Effective Green, g (s)	26.0		26.0		26.0		65.0	65.0			65.0	
Actuated g/C Ratio	0.26		0.26		0.26		0.65	0.65			0.65	
Clearance Time (s)	5.0		5.0		5.0		4.0	4.0			4.0	
Lane Grp Cap (vph)	637		364		412		198	2895			2735	
v/s Ratio Prot					0.00			0.28				
v/s Ratio Perm	c0.16		0.03				0.10				c0.31	
v/c Ratio	0.60		0.10		0.00		0.16	0.43			0.47	
Uniform Delay, d1	32.4		28.1		27.4		6.8	8.5			8.8	
Progression Factor	1.00		1.00		1.00		0.31	0.28			0.36	
Incremental Delay, d2	4.1		0.6		0.0		1.5	0.4			0.5	
Delay (s)	36.5		28.7		27.4		3.6	2.8			3.7	
Level of Service	D		C		C		A	A			A	
Approach Delay (s)		34.9			27.4			2.8			3.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

1092: Ashland Ave. □ W Polk St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑↱		↰	↑↑↱	
Volume (vph)	219	59	99	14	16	43	24	1135	17	39	1249	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		0.95			0.94		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.96			0.99		0.98	1.00		0.97	1.00	
Frt		0.96			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1425			1407		1627	4430		1612	4366	
Flt Permitted		0.79			0.92		0.16	1.00		0.19	1.00	
Satd. Flow (perm)		1159			1310		274	4430		327	4366	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	231	62	104	15	17	45	25	1195	18	41	1315	42
RTOR Reduction (vph)	0	13	0	0	32	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	384	0	0	45	0	25	1212	0	41	1354	0
Confl. Peds. (#/hr)	61		136	136		61	41		46	46		41
Confl. Bikes (#/hr)			10			6			8			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	2%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Effective Green, g (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Actuated g/C Ratio		0.28			0.28		0.64	0.64		0.64	0.64	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		324			366		175	2835		209	2794	
v/s Ratio Prot								0.27			c0.31	
v/s Ratio Perm		c0.33			0.03		0.09			0.13		
v/c Ratio		1.19			0.12		0.14	0.43		0.20	0.48	
Uniform Delay, d1		36.0			26.8		7.1	8.9		7.4	9.4	
Progression Factor		1.00			1.00		0.98	0.90		0.41	0.30	
Incremental Delay, d2		110.3			0.7		1.6	0.5		1.9	0.6	
Delay (s)		146.3			27.5		8.6	8.4		4.9	3.4	
Level of Service		F			C		A	A		A	A	
Approach Delay (s)		146.3			27.5			8.5			3.4	
Approach LOS		F			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	103	238	79	53	127	58	48	896	107	124	1006	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.77	1.00	0.98		1.00	0.98	
Flpb, ped/bikes	0.83	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1321	1631	1289	1521	1600	1073	1563	4260		1584	4339	
Flt Permitted	0.63	1.00	1.00	0.44	1.00	1.00	0.22	1.00		0.24	1.00	
Satd. Flow (perm)	873	1631	1289	702	1600	1073	363	4260		396	4339	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	108	251	83	56	134	61	51	943	113	131	1059	56
RTOR Reduction (vph)	0	0	40	0	0	44	0	15	0	0	6	0
Lane Group Flow (vph)	108	251	43	56	134	17	51	1041	0	131	1109	0
Confl. Peds. (#/hr)	152		57	57		152	77		40	40		77
Confl. Bikes (#/hr)			8			3			3			2
Heavy Vehicles (%)	0%	3%	0%	0%	5%	3%	0%	3%	0%	1%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	8	0	0	8	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	63.0	63.0		63.0	63.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	63.0	63.0		63.0	63.0	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.63	0.63		0.63	0.63	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	244	456	360	196	448	300	228	2683		249	2733	
v/s Ratio Prot		c0.15			0.08			0.24			0.26	
v/s Ratio Perm	0.12		0.03	0.08		0.02	0.14			c0.33		
v/c Ratio	0.44	0.55	0.12	0.29	0.30	0.06	0.22	0.39		0.53	0.41	
Uniform Delay, d1	29.6	30.6	26.8	28.2	28.3	26.3	8.0	9.1		10.2	9.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.61		1.35	1.13	
Incremental Delay, d2	5.7	4.7	0.7	3.6	1.7	0.4	1.4	0.3		6.7	0.4	
Delay (s)	35.3	35.4	27.5	31.8	30.0	26.7	7.1	5.7		20.5	10.8	
Level of Service	D	D	C	C	C	C	A	A		C	B	
Approach Delay (s)		33.9			29.6			5.8			11.8	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Volume (vph)	120	1058	204	168	663	105	155	831	161	212	988	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.90	1.00	1.00	0.91	1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1572	3160	1334	1596	3069	1265	3062	3002	1127	3087	3069	1138
Flt Permitted	0.24	1.00	1.00	0.13	1.00	1.00	0.12	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	397	3160	1334	211	3069	1265	390	3002	1127	478	3069	1138
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1114	215	177	698	111	163	875	169	223	1040	114
RTOR Reduction (vph)	0	0	148	0	0	76	0	0	58	0	0	76
Lane Group Flow (vph)	126	1114	67	177	698	35	163	875	111	223	1040	38
Confl. Peds. (#/hr)	76		47	47		76	62		78	78		62
Confl. Bikes (#/hr)			4			3			1			6
Heavy Vehicles (%)	1%	1%	0%	0%	4%	2%	1%	1%	0%	0%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	42.4	31.3	31.3	43.6	31.9	31.9	40.8	33.1	33.1	41.2	33.3	33.3
Effective Green, g (s)	42.4	31.3	31.3	43.6	31.9	31.9	40.8	33.1	33.1	41.2	33.3	33.3
Actuated g/C Ratio	0.42	0.31	0.31	0.44	0.32	0.32	0.41	0.33	0.33	0.41	0.33	0.33
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	5.0	3.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	989	417	254	979	403	364	993	373	403	1021	378
v/s Ratio Prot	0.05	c0.35		c0.08	0.23		0.03	0.29		c0.04	c0.34	
v/s Ratio Perm	0.13		0.05	0.22		0.03	0.15		0.10	0.18		0.03
v/c Ratio	0.42	1.13	0.16	0.70	0.71	0.09	0.45	0.88	0.30	0.55	1.02	0.10
Uniform Delay, d1	18.9	34.4	24.9	22.2	30.0	23.9	21.8	31.6	24.8	20.7	33.4	23.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.16	0.87	0.81	1.27	0.44	0.02
Incremental Delay, d2	2.0	70.0	0.8	10.1	4.4	0.4	0.8	10.0	1.8	1.6	32.3	0.5
Delay (s)	20.9	104.4	25.7	32.4	34.4	24.3	26.0	37.4	21.8	28.0	46.9	1.1
Level of Service	C	F	C	C	C	C	C	D	C	C	D	A
Approach Delay (s)		85.5			32.9			33.7			40.1	
Approach LOS		F			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	50.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1096: Ashland Ave. □ W 13th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	47	1	157	4	1	2	45	1094	0	3	1191	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	11	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		0.99	1.00	
Frt		0.90			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1527			1665		1593	2944		1629	2937	
Flt Permitted		0.93			0.91		0.19	1.00		0.22	1.00	
Satd. Flow (perm)		1435			1563		312	2944		372	2937	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	1	165	4	1	2	47	1152	0	3	1254	19
RTOR Reduction (vph)	0	59	0	0	2	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	156	0	0	5	0	47	1152	0	3	1272	0
Confl. Peds. (#/hr)	7		7	7		7	5		28	28		5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.4			17.4		74.6	74.6		74.6	74.6	
Effective Green, g (s)		17.4			17.4		74.6	74.6		74.6	74.6	
Actuated g/C Ratio		0.17			0.17		0.75	0.75		0.75	0.75	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		249			271		232	2196		277	2191	
v/s Ratio Prot								0.39			c0.43	
v/s Ratio Perm		c0.11			0.00		0.15			0.01		
v/c Ratio		0.62			0.02		0.20	0.52		0.01	0.58	
Uniform Delay, d1		38.3			34.2		3.8	5.3		3.3	5.7	
Progression Factor		1.00			1.00		1.00	1.00		0.50	0.36	
Incremental Delay, d2		6.8			0.1		2.0	0.9		0.0	0.7	
Delay (s)		45.0			34.3		5.8	6.2		1.7	2.7	
Level of Service		D			C		A	A		A	A	
Approach Delay (s)		45.0			34.3			6.2			2.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1098: Ashland Ave. □ W 14th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	140	0	99	3	0	6	90	985	1	3	1151	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	10	9	11	10	9
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99		1.00	1.00		0.99	1.00	
Frt		0.94			0.91		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1607			1601		1653	2793		1642	2943	
Flt Permitted		0.81			0.93		0.17	1.00		0.23	1.00	
Satd. Flow (perm)		1348			1518		293	2793		404	2943	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	0	104	3	0	6	95	1037	1	3	1212	61
RTOR Reduction (vph)	0	24	0	0	7	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	227	0	0	2	0	95	1038	0	3	1269	0
Confl. Peds. (#/hr)			24	24			14		12	12		14
Confl. Bikes (#/hr)			6						5			5
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.0			26.0		71.0	71.0		71.0	71.0	
Effective Green, g (s)		26.0			26.0		71.0	71.0		71.0	71.0	
Actuated g/C Ratio		0.25			0.25		0.68	0.68		0.68	0.68	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		333			375		198	1888		273	1990	
v/s Ratio Prot								0.37			c0.43	
v/s Ratio Perm		c0.17			0.00		0.32			0.01		
v/c Ratio		0.68			0.01		0.48	0.55		0.01	0.64	
Uniform Delay, d1		35.8			29.8		8.1	8.8		5.5	9.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		10.8			0.0		8.1	1.2		0.1	1.6	
Delay (s)		46.5			29.8		16.3	9.9		5.6	11.3	
Level of Service		D			C		B	A		A	B	
Approach Delay (s)		46.5			29.8			10.5			11.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱		↰	↑↱	
Volume (vph)	38	214	80	119	245	78	59	810	75	95	1120	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.91	1.00	1.00	0.77	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.88	1.00	1.00	0.95	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	1647	1293	1485	1631	1063	1596	2706		1528	2684	
Flt Permitted	0.45	1.00	1.00	0.50	1.00	1.00	0.15	1.00		0.24	1.00	
Satd. Flow (perm)	668	1647	1293	783	1631	1063	250	2706		393	2684	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	40	225	84	125	258	82	62	853	79	100	1179	59
RTOR Reduction (vph)	0	0	46	0	0	57	0	7	0	0	4	0
Lane Group Flow (vph)	40	225	38	125	258	25	62	925	0	100	1234	0
Confl. Peds. (#/hr)	156		59	59		156	79		58	58		79
Confl. Bikes (#/hr)			6			11						4
Heavy Vehicles (%)	0%	2%	0%	2%	3%	4%	0%	3%	1%	1%	5%	0%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0	58.0	58.0		58.0	58.0	
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0	58.0	58.0		58.0	58.0	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.58	0.58		0.58	0.58	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	207	510	400	242	505	329	145	1569		227	1556	
v/s Ratio Prot		0.14			0.16			0.34			c0.46	
v/s Ratio Perm	0.06		0.03	c0.16		0.02	0.25			0.25		
v/c Ratio	0.19	0.44	0.09	0.52	0.51	0.08	0.43	0.59		0.44	0.79	
Uniform Delay, d1	25.3	27.6	24.5	28.3	28.3	24.4	11.7	13.4		11.8	16.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.91		1.00	1.00	
Incremental Delay, d2	2.1	2.8	0.5	7.7	3.7	0.5	7.6	1.4		6.1	4.2	
Delay (s)	27.4	30.3	25.0	36.0	31.9	24.8	19.2	13.6		17.9	20.6	
Level of Service	C	C	C	D	C	C	B	B		B	C	
Approach Delay (s)		28.7			31.8			13.9			20.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1105: Ashland Ave. □ W 19th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	41	42	12	44	67	55	10	931	33	50	1241	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.97		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.98			0.98		1.00	1.00		1.00	1.00	
Frt		0.98			0.96		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1678			1623		1596	2793		1596	2658	
Flt Permitted		0.83			0.91		0.14	1.00		0.23	1.00	
Satd. Flow (perm)		1432			1491		231	2793		382	2658	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	43	44	13	46	71	58	11	980	35	53	1306	29
RTOR Reduction (vph)	0	6	0	0	18	0	0	3	0	0	2	0
Lane Group Flow (vph)	0	94	0	0	158	0	11	1012	0	53	1333	0
Confl. Peds. (#/hr)	44		50	50		44	46		66	66		46
Confl. Bikes (#/hr)			2			4			6			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	6%	7%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.0			30.0		62.0	62.0		62.0	62.0	
Effective Green, g (s)		30.0			30.0		62.0	62.0		62.0	62.0	
Actuated g/C Ratio		0.30			0.30		0.62	0.62		0.62	0.62	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		429			447		143	1731		236	1647	
v/s Ratio Prot								0.36			c0.50	
v/s Ratio Perm		0.07			c0.11		0.05			0.14		
v/c Ratio		0.22			0.35		0.08	0.58		0.22	0.81	
Uniform Delay, d1		26.2			27.4		7.6	11.3		8.4	14.5	
Progression Factor		1.00			1.00		0.31	0.56		0.46	0.68	
Incremental Delay, d2		1.2			2.2		0.9	1.3		1.5	3.2	
Delay (s)		27.4			29.6		3.3	7.6		5.4	13.0	
Level of Service		C			C		A	A		A	B	
Approach Delay (s)		27.4			29.6			7.6			12.7	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1107: Ashland Ave. □ W 21st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↰↑↑↱		↰	↑↑↱	
Volume (vph)	35	75	22	143	97	27	7	859	64	23	1168	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00			0.99		1.00	1.00	
Flpb, ped/bikes		1.00			0.99			1.00		0.99	1.00	
Frt		0.98			0.99			0.99		1.00	1.00	
Flt Protected		0.99			0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1719			1687			2744		1518	2728	
Flt Permitted		0.87			0.72			0.95		0.25	1.00	
Satd. Flow (perm)		1522			1255			2596		394	2728	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	79	23	151	102	28	7	904	67	24	1229	40
RTOR Reduction (vph)	0	8	0	0	4	0	0	5	0	0	2	0
Lane Group Flow (vph)	0	131	0	0	277	0	0	973	0	24	1267	0
Confl. Peds. (#/hr)	33		17	17		33	20		18	18		20
Confl. Bikes (#/hr)			1			1			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	0%	3%	2%	4%	7%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.4			27.4			64.6		64.6	64.6	
Effective Green, g (s)		27.4			27.4			64.6		64.6	64.6	
Actuated g/C Ratio		0.27			0.27			0.65		0.65	0.65	
Clearance Time (s)		4.0			4.0			4.0		4.0	4.0	
Vehicle Extension (s)		5.0			5.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		417			343			1677		254	1762	
v/s Ratio Prot											c0.46	
v/s Ratio Perm		0.09			c0.22			0.37		0.06		
v/c Ratio		0.31			0.81			0.58		0.09	0.72	
Uniform Delay, d1		28.8			33.8			10.0		6.7	11.7	
Progression Factor		1.00			1.00			1.00		1.53	1.18	
Incremental Delay, d2		0.9			14.6			1.5		0.5	1.7	
Delay (s)		29.7			48.4			11.5		10.7	15.5	
Level of Service		C			D			B		B	B	
Approach Delay (s)		29.7			48.4			11.5			15.4	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL
Lane Configurations	↰	↑↱			↰	↑↱			↰	↑↑	↱	↰
Volume (vph)	81	242	82	84	172	346	39	33	61	756	91	67
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	10	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0			4.0	4.0	4.0	3.0
Lane Util. Factor	1.00	0.95			1.00	0.95			1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00	0.98			1.00	1.00	0.98	1.00
Flpb, ped/bikes	0.90	1.00			1.00	1.00			1.00	1.00	1.00	1.00
Frt	1.00	0.96			1.00	0.98			1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00			0.95	1.00			0.95	1.00	1.00	0.95
Satd. Flow (prot)	1443	3062			1442	3050			1528	2455	667	1460
Flt Permitted	0.51	1.00			0.32	1.00			0.09	1.00	1.00	0.25
Satd. Flow (perm)	781	3062			484	3050			147	2455	667	378
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	255	86	88	181	364	41	35	64	796	96	71
RTOR Reduction (vph)	0	0	0	0	0	6	0	0	0	0	44	0
Lane Group Flow (vph)	85	341	0	0	269	399	0	0	99	796	52	71
Confl. Peds. (#/hr)	99						99		53		6	6
Confl. Bikes (#/hr)			2				6				6	
Heavy Vehicles (%)	0%	4%	2%	10%	11%	5%	3%	9%	2%	3%	11%	13%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	8	0
Parking (#/hr)										74	74	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		pm+pt	pm+pt	NA	Perm	Perm
Protected Phases		4		3	3	8		5	5	2		
Permitted Phases	4			8	8			2	2		2	6
Actuated Green, G (s)	23.0	23.0			39.0	39.0			63.3	63.3	63.3	54.4
Effective Green, g (s)	23.0	23.0			39.0	39.0			63.3	63.3	63.3	54.4
Actuated g/C Ratio	0.18	0.18			0.30	0.30			0.49	0.49	0.49	0.42
Clearance Time (s)	4.0	4.0			3.0	4.0			4.0	4.0	4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	541			241	915			134	1195	324	158
v/s Ratio Prot		0.11			c0.11	0.13			0.03	c0.32		
v/s Ratio Perm	0.11				c0.22				0.32		0.08	0.19
v/c Ratio	0.62	0.63			1.12	0.44			0.74	0.67	0.16	0.45
Uniform Delay, d1	49.4	49.6			42.5	36.6			49.4	25.3	18.6	27.1
Progression Factor	1.00	1.00			1.00	1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2	18.9	5.5			92.7	0.3			19.0	2.9	1.1	2.0
Delay (s)	68.3	55.1			135.2	37.0			68.5	28.3	19.6	29.1
Level of Service	E	E			F	D			E	C	B	C
Approach Delay (s)		57.7				76.2				31.5		
Approach LOS		E				E				C		

Intersection Summary			
HCM 2000 Control Delay	51.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations	↑↑	↲			↰	↱	
Volume (vph)	1103	152	62	4	102	167	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	12	11	11	12	12
Total Lost time (s)	3.0	3.0			4.0	4.0	
Lane Util. Factor	0.95	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	0.84			1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	
Frt	1.00	0.85			1.00	0.85	
Flt Protected	1.00	1.00			0.95	1.00	
Satd. Flow (prot)	2944	1016			1637	1425	
Flt Permitted	1.00	1.00			0.99	1.00	
Satd. Flow (perm)	2944	1016			1702	1425	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1161	160	65	4	107	176	52
RTOR Reduction (vph)	0	59	0	0	0	81	0
Lane Group Flow (vph)	1161	166	0	0	111	147	0
Confl. Peds. (#/hr)		53					
Confl. Bikes (#/hr)		1					
Heavy Vehicles (%)	5%	4%	0%	0%	1%	9%	2%
Bus Blockages (#/hr)	0	8	0	0	0	0	0
Parking (#/hr)	6	6					
Turn Type	NA	Perm		Perm	NA	Perm	
Protected Phases	6				9		
Permitted Phases		6		9		9	
Actuated Green, G (s)	54.4	54.4			15.7	15.7	
Effective Green, g (s)	54.4	54.4			15.7	15.7	
Actuated g/C Ratio	0.42	0.42			0.12	0.12	
Clearance Time (s)	3.0	3.0			4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	1231	425			205	172	
v/s Ratio Prot	c0.39						
v/s Ratio Perm		0.16			0.07	c0.10	
v/c Ratio	0.94	0.39			0.54	0.86	
Uniform Delay, d1	36.3	26.3			53.8	56.0	
Progression Factor	1.00	1.00			1.00	1.00	
Incremental Delay, d2	14.1	0.6			2.9	31.6	
Delay (s)	50.4	26.9			56.7	87.7	
Level of Service	D	C			E	F	
Approach Delay (s)	45.8				77.5		
Approach LOS	D				E		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1110: Ashland Ave. □ 2451 S Ashland Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	2	0	4	0	0	1	2	1024	0	2	1359	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.97			0.97		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.91			0.86		1.00	1.00		1.00	1.00	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1546			1508		1651	3149		1653	3272	
Flt Permitted		1.00			1.00		0.18	1.00		0.26	1.00	
Satd. Flow (perm)		1572			1508		311	3149		460	3272	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2	0	4	0	0	1	2	1078	0	2	1431	2
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	2	1078	0	2	1433	0
Confl. Peds. (#/hr)	1		2	2		1	12		1	1		12
Confl. Bikes (#/hr)									2			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.5			1.5		88.5	88.5		88.5	88.5	
Effective Green, g (s)		1.5			1.5		88.5	88.5		88.5	88.5	
Actuated g/C Ratio		0.02			0.02		0.88	0.88		0.88	0.88	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		23			22		275	2786		407	2895	
v/s Ratio Prot					0.00			0.34			c0.44	
v/s Ratio Perm		c0.00					0.01			0.00		
v/c Ratio		0.00			0.00		0.01	0.39		0.00	0.49	
Uniform Delay, d1		48.5			48.5		0.7	1.0		0.7	1.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.0		0.0	0.4		0.0	0.6	
Delay (s)		48.7			48.5		0.7	1.4		0.7	1.8	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		48.7			48.5			1.4			1.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1111: Ashland Ave. □ 27th Street

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑↑	↑↱	
Volume (vph)	1	0	1	1008	1360	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0		3.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	1.00	
Flt Protected	0.95		0.95	1.00	1.00	
Satd. Flow (prot)	1710		1652	3210	3210	
Flt Permitted	0.95		0.17	1.00	1.00	
Satd. Flow (perm)	1710		289	3210	3210	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	0	1	1061	1432	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1	0	1	1061	1432	0
Confl. Peds. (#/hr)		10	16			16
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	0%	0%	0%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	8
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	1.2		79.8	79.8	75.7	
Effective Green, g (s)	1.2		79.8	79.8	75.7	
Actuated g/C Ratio	0.01		0.89	0.89	0.84	
Clearance Time (s)	4.0		3.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	22		272	2846	2699	
v/s Ratio Prot	c0.00		0.00	c0.33	c0.45	
v/s Ratio Perm			0.00			
v/c Ratio	0.05		0.00	0.37	0.53	
Uniform Delay, d1	43.8		1.0	0.9	2.1	
Progression Factor	1.00		1.17	0.91	1.00	
Incremental Delay, d2	0.9		0.0	0.4	0.8	
Delay (s)	44.7		1.1	1.1	2.8	
Level of Service	D		A	A	A	
Approach Delay (s)	44.7			1.1	2.8	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1112: Ashland Ave. □ W Marketplace Access Rd.

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑↑	↑↱	
Volume (vph)	8	18	24	891	1233	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0	3.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1710	1268	1653	2702	2716	
Flt Permitted	0.95	1.00	0.19	1.00	1.00	
Satd. Flow (perm)	1710	1268	325	2702	2716	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	19	25	938	1298	8
RTOR Reduction (vph)	0	18	0	0	0	0
Lane Group Flow (vph)	8	1	25	938	1306	0
Confl. Peds. (#/hr)		2	3			3
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	17%	0%	4%	4%	0%
Parking (#/hr)				40	38	
Turn Type	NA	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	2.9	2.9	78.1	78.1	72.7	
Effective Green, g (s)	2.9	2.9	78.1	78.1	72.7	
Actuated g/C Ratio	0.03	0.03	0.87	0.87	0.81	
Clearance Time (s)	4.0	4.0	3.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	55	40	317	2344	2193	
v/s Ratio Prot	c0.00		0.00	c0.35	c0.48	
v/s Ratio Perm		0.00	0.07			
v/c Ratio	0.15	0.02	0.08	0.40	0.60	
Uniform Delay, d1	42.3	42.2	1.2	1.2	3.2	
Progression Factor	1.00	1.00	1.00	1.00	0.71	
Incremental Delay, d2	1.2	0.2	0.1	0.5	1.1	
Delay (s)	43.6	42.3	1.4	1.7	3.3	
Level of Service	D	D	A	A	A	
Approach Delay (s)	42.7			1.7	3.3	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1113: Ashland Ave. □ W 31st Pl.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		✥			↑↑↱		↰	↑↑	↱
Volume (vph)	291	1	158	22	1	13	0	704	22	14	1104	281
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0			12.0		12.0	12.0	12.0
Lane Util. Factor	0.95	0.95	1.00		1.00			0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00		0.99			1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00			1.00		0.96	1.00	1.00
Frt	1.00	1.00	0.85		0.95			1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1525	1529	1232		1160			3154		963	3210	1371
Flt Permitted	0.95	0.95	1.00		0.97			1.00		0.35	1.00	1.00
Satd. Flow (perm)	1525	1529	1232		1160			3154		356	3210	1371
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	306	1	166	23	1	14	0	741	23	15	1162	296
RTOR Reduction (vph)	0	0	119	0	13	0	0	2	0	0	0	129
Lane Group Flow (vph)	153	154	47	0	25	0	0	762	0	15	1162	167
Confl. Peds. (#/hr)	2					2	3		70	70		3
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	3%	0%	20%	41%	0%	46%	0%	3%	32%	64%	3%	5%
Turn Type	Split	NA	Perm	Split	NA			NA		Perm	NA	Perm
Protected Phases	4	4		8	8			2			6	
Permitted Phases			4							6		6
Actuated Green, G (s)	23.0	23.0	23.0		5.1			61.9		61.9	61.9	61.9
Effective Green, g (s)	23.0	23.0	23.0		5.1			61.9		61.9	61.9	61.9
Actuated g/C Ratio	0.21	0.21	0.21		0.05			0.56		0.56	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0		4.0			12.0		12.0	12.0	12.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	318	319	257		53			1774		200	1806	771
v/s Ratio Prot	0.10	c0.10			c0.02			0.24			c0.36	
v/s Ratio Perm			0.04							0.04		0.12
v/c Ratio	0.48	0.48	0.18		0.47			0.43		0.07	0.64	0.22
Uniform Delay, d1	38.3	38.3	35.8		51.1			13.9		11.0	16.5	12.0
Progression Factor	1.00	1.00	1.00		1.00			0.45		1.00	1.00	1.00
Incremental Delay, d2	5.1	5.2	1.5		6.3			0.6		0.7	1.8	0.6
Delay (s)	43.4	43.4	37.3		57.5			6.9		11.7	18.3	12.6
Level of Service	D	D	D		E			A		B	B	B
Approach Delay (s)		41.3			57.5			6.9			17.1	
Approach LOS		D			E			A			B	

Intersection Summary

HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. □ S Archer Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↑↑	↱	↰	↑↑	↱
Volume (vph)	101	621	68	178	972	46	1	566	127	146	799	172
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	12
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0	3.0	3.0	5.0	3.0
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.94	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	4542		1623	4408			2963	1166	1566	3033	1145
Flt Permitted	0.14	1.00		0.36	1.00			0.95	1.00	0.28	1.00	1.00
Satd. Flow (perm)	241	4542		622	4408			2827	1166	467	3033	1145
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	654	72	187	1023	48	1	596	134	154	841	181
RTOR Reduction (vph)	0	12	0	0	5	0	0	0	71	0	0	9
Lane Group Flow (vph)	106	714	0	187	1066	0	0	597	63	154	841	172
Confl. Peds. (#/hr)	24		69	69		24	25		65	65		25
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	2%	4%	1%	3%	7%	0%	6%	4%	5%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8			2	3	1	6	7
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	53.0	44.0		43.1	37.1			37.0	43.0	47.0	47.0	59.9
Effective Green, g (s)	53.0	44.0		43.1	37.1			37.0	43.0	47.0	47.0	59.9
Actuated g/C Ratio	0.48	0.40		0.39	0.34			0.34	0.39	0.43	0.43	0.54
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	5.0
Lane Grp Cap (vph)	281	1816		298	1486			950	455	269	1295	623
v/s Ratio Prot	c0.04	0.16		c0.03	c0.24				0.01	0.04	c0.28	0.03
v/s Ratio Perm	0.14			0.21				0.21	0.05	0.21		0.12
v/c Ratio	0.38	0.39		0.63	0.72			0.63	0.14	0.57	0.65	0.28
Uniform Delay, d1	17.8	23.5		23.6	31.9			30.7	21.6	21.1	25.0	13.4
Progression Factor	1.00	1.00		1.00	1.00			1.02	0.65	0.54	0.49	0.12
Incremental Delay, d2	1.8	0.1		4.1	3.0			3.1	0.1	2.4	2.0	0.4
Delay (s)	19.6	23.6		27.7	34.9			34.3	14.0	13.8	14.3	2.0
Level of Service	B	C		C	C			C	B	B	B	A
Approach Delay (s)		23.1			33.8			30.6			12.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1115: Ashland Ave. □ W Robinson St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑↱		↰	↑↱	
Volume (vph)	0	0	0	77	58	8	175	600	36	54	934	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	12	12	12	12
Total Lost time (s)					4.0	4.0	3.0	4.0		3.0	4.0	
Lane Util. Factor					1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes					1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes					0.99	1.00	1.00	1.00		0.99	1.00	
Frt					1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected					0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1670	1491	1460	3061		1662	3154	
Flt Permitted					0.97	1.00	0.23	1.00		0.40	1.00	
Satd. Flow (perm)					1670	1491	354	3061		695	3154	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	81	61	8	184	632	38	57	983	28
RTOR Reduction (vph)	0	0	0	0	0	7	0	3	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	142	1	184	667	0	57	1010	0
Confl. Peds. (#/hr)	6		10	10		6	22		14	14		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	13%	7%	0%	2%	8%	0%
Turn Type				Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases					8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)					14.6	14.6	87.4	79.2		78.5	73.3	
Effective Green, g (s)					14.6	14.6	87.4	79.2		78.5	73.3	
Actuated g/C Ratio					0.13	0.13	0.79	0.72		0.71	0.67	
Clearance Time (s)					4.0	4.0	3.0	4.0		3.0	4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)					221	197	392	2203		541	2101	
v/s Ratio Prot							c0.05	0.22		0.00	0.32	
v/s Ratio Perm					0.09	0.00	c0.33			0.07		
v/c Ratio					0.64	0.01	0.47	0.30		0.11	0.48	
Uniform Delay, d1					45.2	41.4	4.3	5.5		4.7	9.0	
Progression Factor					1.00	1.00	3.40	0.44		0.59	0.49	
Incremental Delay, d2					6.3	0.0	0.8	0.3		0.1	0.6	
Delay (s)					51.5	41.4	15.4	2.7		2.8	5.1	
Level of Service					D	D	B	A		A	A	
Approach Delay (s)		0.0			50.9			5.5			4.9	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			↑↱		↰	↑↑	
Volume (vph)	14	22	27	49	1	39	3	711	17	10	963	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)	4.0	4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00			0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			0.99			1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	0.92			0.94			1.00		1.00	1.00	
Flt Protected	0.95	1.00			0.97			1.00		0.95	1.00	
Satd. Flow (prot)	1701	1603			1544			2565		1588	2904	
Flt Permitted	0.70	1.00			0.84			0.95		0.31	1.00	
Satd. Flow (perm)	1260	1603			1337			2443		510	2904	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	23	28	52	1	41	3	748	18	11	1014	2
RTOR Reduction (vph)	0	18	0	0	25	0	0	2	0	0	0	0
Lane Group Flow (vph)	15	33	0	0	69	0	0	767	0	11	1016	0
Confl. Peds. (#/hr)	4		2	2		4	7		5	5		7
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	0%	0%	4%	4%	0%	8%	0%	6%	0%	0%	7%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	39.0	39.0			39.0			63.0		63.0	63.0	
Effective Green, g (s)	39.0	39.0			39.0			63.0		63.0	63.0	
Actuated g/C Ratio	0.35	0.35			0.35			0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0			4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	446	568			474			1399		292	1663	
v/s Ratio Prot		0.02									c0.35	
v/s Ratio Perm	0.01				c0.05			0.31		0.02		
v/c Ratio	0.03	0.06			0.15			0.55		0.04	0.61	
Uniform Delay, d1	23.2	23.4			24.2			14.6		10.3	15.4	
Progression Factor	1.00	1.00			1.00			2.05		0.56	0.47	
Incremental Delay, d2	0.1	0.2			0.6			1.4		0.2	1.5	
Delay (s)	23.3	23.6			24.8			31.5		5.9	8.7	
Level of Service	C	C			C			C		A	A	
Approach Delay (s)		23.5			24.8			31.5			8.7	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1121: Ashland Ave. □ W 35th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	58	199	58	56	276	108	75	611	41	110	840	72
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00	0.92
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1552	1585	1260	1546	1538	1242	1541	2663	945	1471	2708	979
Flt Permitted	0.37	1.00	1.00	0.53	1.00	1.00	0.25	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)	604	1585	1260	862	1538	1242	412	2663	945	517	2708	979
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	209	61	59	291	114	79	643	43	116	884	76
RTOR Reduction (vph)	0	0	31	0	1	39	0	0	21	0	0	27
Lane Group Flow (vph)	61	209	30	59	301	64	79	643	22	116	884	49
Confl. Peds. (#/hr)	11		12	12		11	17		12	12		17
Confl. Bikes (#/hr)						2			1			
Heavy Vehicles (%)	2%	6%	10%	2%	3%	6%	7%	8%	5%	12%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	62.9	56.3	56.3	67.1	58.4	58.4
Effective Green, g (s)	33.0	33.0	33.0	33.0	33.0	33.0	62.9	56.3	56.3	67.1	58.4	58.4
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.57	0.51	0.51	0.61	0.53	0.53
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	181	475	378	258	461	372	303	1362	483	390	1437	519
v/s Ratio Prot		0.13			c0.20		0.02	0.24		c0.02	c0.33	
v/s Ratio Perm	0.10		0.02	0.07		0.05	0.13		0.02	0.16		0.05
v/c Ratio	0.34	0.44	0.08	0.23	0.65	0.17	0.26	0.47	0.05	0.30	0.62	0.09
Uniform Delay, d1	30.0	31.0	27.6	28.9	33.5	28.4	11.4	17.3	13.4	9.7	18.0	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.25	0.29	0.09
Incremental Delay, d2	5.0	2.9	0.4	2.1	7.0	1.0	0.5	1.2	0.2	0.4	1.7	0.3
Delay (s)	35.0	34.0	28.0	31.0	40.5	29.4	11.8	18.5	13.6	2.8	6.9	1.5
Level of Service	C	C	C	C	D	C	B	B	B	A	A	A
Approach Delay (s)		33.1			36.8			17.5			6.1	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1123: Ashland Ave. □ W 37th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	23	3	15	11	4	19	16	703	6	4	951	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		4.0			4.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.93		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1651			1479		1595	2933		1064	2984	
Flt Permitted		0.81			0.88		0.27	1.00		0.37	1.00	
Satd. Flow (perm)		1369			1324		460	2933		413	2984	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	24	3	16	12	4	20	17	740	6	4	1001	19
RTOR Reduction (vph)	0	15	0	0	18	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	28	0	0	18	0	17	746	0	4	1019	0
Confl. Peds. (#/hr)	4					4	1					1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	9%	0%	11%	0%	7%	0%	50%	5%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.3			6.3		59.7	59.7		59.7	59.7	
Effective Green, g (s)		6.3			6.3		59.7	59.7		59.7	59.7	
Actuated g/C Ratio		0.08			0.08		0.80	0.80		0.80	0.80	
Clearance Time (s)		4.0			4.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		114			111		366	2334		328	2375	
v/s Ratio Prot								0.25			c0.34	
v/s Ratio Perm		c0.02			0.01		0.04			0.01		
v/c Ratio		0.25			0.16		0.05	0.32		0.01	0.43	
Uniform Delay, d1		32.1			31.9		1.6	2.1		1.6	2.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.4			1.4		0.2	0.4		0.1	0.6	
Delay (s)		34.5			33.3		1.9	2.5		1.6	2.9	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		34.5			33.3			2.4			2.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑	↱	↰	↑	↱
Volume (vph)	14	180	146	166	421	118	132	92	80	71	129	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	12	12	11	12	13
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1653	3119	1396	1585	3119	1321	1629	1350	1149	1366	1446	1354
Flt Permitted	0.50	1.00	1.00	0.58	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	862	3119	1396	961	3119	1321	1629	1350	1149	1366	1446	1354
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	189	154	175	443	124	139	97	84	75	136	65
RTOR Reduction (vph)	0	0	96	0	0	66	0	0	66	0	0	55
Lane Group Flow (vph)	15	189	58	175	443	58	139	97	18	75	136	10
Confl. Peds. (#/hr)			3	3			4		4	4		4
Heavy Vehicles (%)	0%	6%	3%	4%	6%	12%	5%	20%	14%	21%	12%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	33.2	31.8	31.8	44.0	39.6	39.6	18.6	18.6	18.6	13.4	13.4	13.4
Effective Green, g (s)	33.2	31.8	31.8	44.0	39.6	39.6	18.6	18.6	18.6	13.4	13.4	13.4
Actuated g/C Ratio	0.39	0.37	0.37	0.52	0.47	0.47	0.22	0.22	0.22	0.16	0.16	0.16
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	349	1166	522	564	1453	615	356	295	251	215	227	213
v/s Ratio Prot	0.00	0.06		c0.03	0.14		c0.09	0.07		0.05	c0.09	
v/s Ratio Perm	0.02		0.04	c0.13		0.04			0.02			0.01
v/c Ratio	0.04	0.16	0.11	0.31	0.30	0.09	0.39	0.33	0.07	0.35	0.60	0.05
Uniform Delay, d1	15.9	17.7	17.4	11.2	14.1	12.7	28.4	27.9	26.4	31.9	33.3	30.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.4	0.3	0.5	0.3	3.2	3.0	0.6	1.0	4.2	0.1
Delay (s)	16.0	18.0	17.8	11.5	14.7	13.0	31.6	30.9	26.9	32.9	37.5	30.5
Level of Service	B	B	B	B	B	B	C	C	C	C	D	C
Approach Delay (s)		17.8			13.6			30.1			34.6	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1130: Ashland Ave. □ W 42nd St. (West)

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	⋎		↰	↑↑	↑↑	↱
Volume (vph)	33	19	28	637	1121	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	12	11	11	12
Total Lost time (s)	5.0		3.0	3.0	3.0	3.0
Lane Util. Factor	1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes	0.99		1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.95		1.00	1.00	1.00	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1566		1541	2673	3179	1442
Flt Permitted	0.97		0.17	1.00	1.00	1.00
Satd. Flow (perm)	1566		275	2673	3179	1442
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	35	20	29	671	1180	66
RTOR Reduction (vph)	18	0	0	0	0	8
Lane Group Flow (vph)	37	0	29	671	1180	58
Confl. Peds. (#/hr)	4	1	6			6
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	5%	11%	7%	4%	2%
Parking (#/hr)				34		
Turn Type	NA		custom	NA	NA	Perm
Protected Phases	4		5 9	2 9	6	
Permitted Phases			2			6
Actuated Green, G (s)	10.0		77.0	80.0	63.3	63.3
Effective Green, g (s)	10.0		77.0	80.0	63.3	63.3
Actuated g/C Ratio	0.10		0.77	0.80	0.63	0.63
Clearance Time (s)	5.0				3.0	3.0
Vehicle Extension (s)	7.0				3.0	3.0
Lane Grp Cap (vph)	156		347	2138	2012	912
v/s Ratio Prot	c0.02		0.01	c0.25	c0.37	
v/s Ratio Perm			0.06			0.04
v/c Ratio	0.24		0.08	0.31	0.59	0.06
Uniform Delay, d1	41.5		4.7	2.7	10.7	7.0
Progression Factor	1.00		0.08	0.06	1.00	1.00
Incremental Delay, d2	2.8		0.1	0.1	1.3	0.1
Delay (s)	44.3		0.5	0.2	12.0	7.2
Level of Service	D		A	A	B	A
Approach Delay (s)	44.3			0.2	11.7	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1131: Ashland Ave. □ W 42nd Pl.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↰↑↑↱		↰	↑↑↱	
Volume (vph)	7	0	21	0	0	4	3	631	1	2	710	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	12	11	11	11	11	12
Total Lost time (s)		5.0			5.0			3.0		5.0	3.0	
Lane Util. Factor		1.00			1.00			0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		0.90			0.86			1.00		1.00	1.00	
Flt Protected		0.99			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1596			1038			2991		1102	2989	
Flt Permitted		0.94			1.00			0.95		0.40	1.00	
Satd. Flow (perm)		1512			1038			2852		461	2989	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	0	22	0	0	4	3	664	1	2	747	4
RTOR Reduction (vph)	0	26	0	0	4	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	3	0	0	0	0	0	668	0	2	751	0
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	0%	5%	0%	50%	5%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		custom	NA	
Protected Phases		4			8			2		13	6 13	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.0			10.0			70.0		70.3	73.3	
Effective Green, g (s)		10.0			10.0			70.0		70.3	73.3	
Actuated g/C Ratio		0.10			0.10			0.70		0.70	0.73	
Clearance Time (s)		5.0			5.0			3.0		5.0		
Vehicle Extension (s)		7.0			7.0			3.0		3.0		
Lane Grp Cap (vph)		151			103			1996		368	2190	
v/s Ratio Prot					0.00					0.00	c0.25	
v/s Ratio Perm		c0.00						c0.23		0.00		
v/c Ratio		0.02			0.00			0.33		0.01	0.34	
Uniform Delay, d1		40.6			40.5			5.9		4.4	4.8	
Progression Factor		1.00			1.00			0.58		0.07	0.04	
Incremental Delay, d2		0.2			0.1			0.4		0.0	0.1	
Delay (s)		40.8			40.6			3.8		0.3	0.3	
Level of Service		D			D			A		A	A	
Approach Delay (s)		40.8			40.6			3.8			0.3	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1132: Ashland Ave. □ W 43rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	75	95	43	49	160	91	66	456	17	54	693	115
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1590	1566		1484	1585	1265	1600	2771	992	1409	2750	956
Flt Permitted	0.59	1.00		0.63	1.00	1.00	0.32	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	988	1566		985	1585	1265	539	2771	992	667	2750	956
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	100	45	52	168	96	69	480	18	57	729	121
RTOR Reduction (vph)	0	16	0	0	0	70	0	0	8	0	0	54
Lane Group Flow (vph)	79	129	0	52	168	26	69	480	10	57	729	67
Confl. Peds. (#/hr)	4		15	15		4	12		4	4		12
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	0%	1%	2%	6%	6%	11%	3%	5%	6%	17%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	27.0	27.0		27.0	27.0	27.0	61.0	55.4	55.4	61.0	55.4	55.4
Effective Green, g (s)	27.0	27.0		27.0	27.0	27.0	61.0	55.4	55.4	61.0	55.4	55.4
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.61	0.55	0.55	0.61	0.55	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0
Lane Grp Cap (vph)	266	422		265	427	341	388	1535	549	448	1523	529
v/s Ratio Prot		0.08			c0.11		c0.01	0.17		0.01	c0.27	
v/s Ratio Perm	0.08			0.05		0.02	0.10		0.01	0.07		0.07
v/c Ratio	0.30	0.31		0.20	0.39	0.08	0.18	0.31	0.02	0.13	0.48	0.13
Uniform Delay, d1	29.0	29.0		28.1	29.8	27.2	8.3	12.0	10.0	8.0	13.5	10.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.93	1.00	0.81	0.62	0.40
Incremental Delay, d2	2.8	1.9		1.7	2.7	0.4	0.5	0.5	0.1	0.3	1.1	0.5
Delay (s)	31.8	30.9		29.8	32.5	27.6	7.7	11.8	10.1	6.7	9.5	4.8
Level of Service	C	C		C	C	C	A	B	B	A	A	A
Approach Delay (s)		31.2			30.6			11.2			8.7	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1133: Ashland Ave. □ W 44th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	13	5	17	29	18	16	28	533	7	7	695	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	11	10	11	11
Total Lost time (s)		5.0			5.0		4.0	4.0		3.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		0.98	1.00		0.99	1.00	
Frt		0.93			0.97		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1621			1601		1556	2850		1011	2662	
Flt Permitted		0.90			0.83		0.36	1.00		0.42	1.00	
Satd. Flow (perm)		1484			1366		592	2850		446	2662	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	5	18	31	19	17	29	561	7	7	732	34
RTOR Reduction (vph)	0	16	0	0	15	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	21	0	0	52	0	29	568	0	7	764	0
Confl. Peds. (#/hr)	7		3	3		7	23		11	11		23
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	0%	7%	0%	6%	0%	5%	29%	57%	4%	0%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.5			9.5		77.3	77.3		81.5	81.5	
Effective Green, g (s)		9.5			9.5		77.3	77.3		81.5	81.5	
Actuated g/C Ratio		0.10			0.10		0.77	0.77		0.82	0.82	
Clearance Time (s)		5.0			5.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)		5.0			5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		140			129		457	2203		370	2169	
v/s Ratio Prot								0.20		0.00	c0.29	
v/s Ratio Perm		0.01			c0.04		0.05			0.02		
v/c Ratio		0.15			0.40		0.06	0.26		0.02	0.35	
Uniform Delay, d1		41.5			42.6		2.7	3.2		1.8	2.4	
Progression Factor		1.00			1.00		1.19	1.15		0.07	0.11	
Incremental Delay, d2		1.0			4.2		0.3	0.3		0.0	0.4	
Delay (s)		42.6			46.8		3.5	4.0		0.1	0.7	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		42.6			46.8			4.0			0.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	28	10	7	18	6	28	15	484	20	35	697	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		0.99	1.00		0.98	1.00	
Frt		0.98			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1691			1611		1587	2658		1476	2706	
Flt Permitted		0.84			0.92		0.32	1.00		0.44	1.00	
Satd. Flow (perm)		1472			1502		539	2658		676	2706	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	11	7	19	6	29	16	509	21	37	734	33
RTOR Reduction (vph)	0	5	0	0	21	0	0	3	0	0	3	0
Lane Group Flow (vph)	0	42	0	0	33	0	16	527	0	37	764	0
Confl. Peds. (#/hr)	11		9	9		11	6		12	12		6
Confl. Bikes (#/hr)						1			2			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	0%	6%	3%	3%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0		63.0	63.0		63.0	63.0	
Effective Green, g (s)		28.0			28.0		63.0	63.0		63.0	63.0	
Actuated g/C Ratio		0.28			0.28		0.63	0.63		0.63	0.63	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		412			420		339	1674		425	1704	
v/s Ratio Prot								0.20			c0.28	
v/s Ratio Perm		c0.03			0.02		0.03			0.05		
v/c Ratio		0.10			0.08		0.05	0.31		0.09	0.45	
Uniform Delay, d1		26.7			26.5		7.1	8.5		7.2	9.5	
Progression Factor		1.00			1.00		1.07	0.97		0.41	0.58	
Incremental Delay, d2		0.5			0.4		0.3	0.5		0.4	0.8	
Delay (s)		27.2			26.9		7.8	8.8		3.3	6.4	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		27.2			26.9			8.7			6.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1135: Ashland Ave. □ W 46th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	36	44	37	11	23	40	16	425	35	56	636	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		0.98	1.00		0.92	1.00	
Frt		0.96			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1643			1559		1569	2634		1474	2606	
Flt Permitted		0.90			0.96		0.35	1.00		0.46	1.00	
Satd. Flow (perm)		1507			1509		576	2634		716	2606	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	46	39	12	24	42	17	447	37	59	669	42
RTOR Reduction (vph)	0	17	0	0	30	0	0	6	0	0	5	0
Lane Group Flow (vph)	0	106	0	0	48	0	17	478	0	59	706	0
Confl. Peds. (#/hr)	37		9	9		37	14		39	39		14
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	3%	0%	4%	2%	0%	5%	0%	0%	4%	2%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Effective Green, g (s)		28.0			28.0		64.0	64.0		64.0	64.0	
Actuated g/C Ratio		0.28			0.28		0.64	0.64		0.64	0.64	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		421			422		368	1685		458	1667	
v/s Ratio Prot								0.18			c0.27	
v/s Ratio Perm		c0.07			0.03		0.03			0.08		
v/c Ratio		0.25			0.11		0.05	0.28		0.13	0.42	
Uniform Delay, d1		27.9			26.8		6.7	7.9		7.1	8.9	
Progression Factor		1.00			1.00		0.82	0.89		0.42	0.33	
Incremental Delay, d2		1.4			0.5		0.2	0.4		0.5	0.7	
Delay (s)		29.3			27.3		5.7	7.5		3.5	3.7	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		29.3			27.3			7.4			3.6	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1136: Ashland Ave. □ W 47th St.□S. McDowell Ave.

8/8/2013

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR2	SBL	SBT
	↗	→	↘	↙	←	↖	↰	↖	↑	↗	↘	↓
Lane Configurations	↰	↑↱		↰	↑↱			↰	↑↑	↱	↰	↑↑
Volume (vph)	73	235	28	138	362	81	5	71	357	87	71	513
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95	1.00	1.00	0.95
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.98	1.00	1.00	0.93	1.00
Frt	1.00	0.98		1.00	0.97			1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1492	2855		1532	2787			1578	2534	1464	1425	3020
Flt Permitted	0.42	1.00		0.55	1.00			0.40	1.00	1.00	0.50	1.00
Satd. Flow (perm)	662	2855		884	2787			661	2534	1464	754	3020
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	247	29	145	381	85	5	75	376	92	75	540
RTOR Reduction (vph)	0	9	0	0	1	0	0	0	0	47	0	0
Lane Group Flow (vph)	77	267	0	145	470	0	0	75	376	45	75	540
Confl. Peds. (#/hr)			53	53		74		25			75	
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	7%	9%	11%	2%	10%	6%	0%	3%	7%	1%	8%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)									52			0
Turn Type	pm+pt	NA		pm+pt	NA			Perm	NA	Perm	Perm	NA
Protected Phases	7	4		3	8				2			6
Permitted Phases	4			8				2		2	6	
Actuated Green, G (s)	38.4	33.6		40.8	34.8			48.4	48.4	48.4	48.4	48.4
Effective Green, g (s)	38.4	33.6		40.8	34.8			48.4	48.4	48.4	48.4	48.4
Actuated g/C Ratio	0.38	0.34		0.41	0.35			0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	294	959		399	969			319	1226	708	364	1461
v/s Ratio Prot	0.01	0.09		c0.02	c0.17				0.15			c0.18
v/s Ratio Perm	0.09			0.13				0.11		0.03	0.10	
v/c Ratio	0.26	0.28		0.36	0.49			0.24	0.31	0.06	0.21	0.37
Uniform Delay, d1	20.1	24.3		19.4	25.6			15.0	15.6	13.7	14.8	16.2
Progression Factor	1.00	1.00		1.00	1.00			1.15	1.12	2.04	0.63	0.58
Incremental Delay, d2	0.5	0.7		0.6	1.7			1.7	0.6	0.2	1.2	0.7
Delay (s)	20.6	25.0		20.0	27.3			18.9	18.2	28.2	10.5	10.1
Level of Service	C	C		B	C			B	B	C	B	B
Approach Delay (s)		24.1			25.6				20.0			9.7
Approach LOS		C			C				B			A

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR	SWR2
Lane Configurations	↱	↱
Volume (vph)	67	22
Ideal Flow (vphpl)	1800	1800
Lane Width	11	12
Total Lost time (s)	4.0	5.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	0.95	1.00
Flpb, ped/bikes	1.00	1.00
Frt	0.85	0.86
Flt Protected	1.00	1.00
Satd. Flow (prot)	1141	1557
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1141	1557
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	71	23
RTOR Reduction (vph)	37	15
Lane Group Flow (vph)	34	8
Confl. Peds. (#/hr)	25	
Confl. Bikes (#/hr)		
Heavy Vehicles (%)	7%	0%
Bus Blockages (#/hr)	8	0
Parking (#/hr)	0	
Turn Type	Perm	custom
Protected Phases		
Permitted Phases	6	8
Actuated Green, G (s)	48.4	34.8
Effective Green, g (s)	48.4	34.8
Actuated g/C Ratio	0.48	0.35
Clearance Time (s)	4.0	5.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	552	541
v/s Ratio Prot		
v/s Ratio Perm	0.03	0.01
v/c Ratio	0.06	0.01
Uniform Delay, d1	13.7	21.4
Progression Factor	0.42	1.00
Incremental Delay, d2	0.2	0.0
Delay (s)	6.0	21.4
Level of Service	A	C
Approach Delay (s)		
Approach LOS		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↑			↑↱	
Volume (vph)	0	0	0	22	26	17	30	547	0	0	973	42
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	12	11	12
Total Lost time (s)					5.0		4.0	4.0			4.0	
Lane Util. Factor					1.00		1.00	0.95			0.95	
Frpb, ped/bikes					0.99		1.00	1.00			0.99	
Flpb, ped/bikes					0.99		0.99	1.00			1.00	
Frt					0.96		1.00	1.00			0.99	
Flt Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					1648		1528	2734			2619	
Flt Permitted					0.98		0.22	1.00			1.00	
Satd. Flow (perm)					1648		360	2734			2619	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	23	27	18	32	576	0	0	1024	44
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	55	0	32	576	0	0	1065	0
Confl. Peds. (#/hr)	21		20	20		21	27		10	10		27
Heavy Vehicles (%)	0%	0%	0%	0%	4%	0%	3%	4%	0%	0%	3%	2%
Parking (#/hr)								36			50	
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					24.0		67.0	67.0			67.0	
Effective Green, g (s)					24.0		67.0	67.0			67.0	
Actuated g/C Ratio					0.24		0.67	0.67			0.67	
Clearance Time (s)					5.0		4.0	4.0			4.0	
Lane Grp Cap (vph)					395		241	1831			1754	
v/s Ratio Prot								0.21			c0.41	
v/s Ratio Perm					0.03		0.09					
v/c Ratio					0.14		0.13	0.31			0.61	
Uniform Delay, d1					29.9		6.0	6.9			9.2	
Progression Factor					1.00		0.68	0.66			0.73	
Incremental Delay, d2					0.7		1.1	0.4			1.5	
Delay (s)					30.6		5.2	5.0			8.2	
Level of Service					C		A	A			A	
Approach Delay (s)		0.0			30.6			5.0			8.2	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1138: Ashland Ave. □ W 49th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	43	39	24	12	19	23	16	419	25	52	620	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00		0.97	1.00		0.97	1.00	
Frt		0.97			0.94		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1668			1628		1457	2629		1511	2621	
Flt Permitted		0.87			0.94		0.37	1.00		0.48	1.00	
Satd. Flow (perm)		1478			1542		564	2629		756	2621	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	41	25	13	20	24	17	441	26	55	653	29
RTOR Reduction (vph)	0	11	0	0	18	0	0	4	0	0	3	0
Lane Group Flow (vph)	0	100	0	0	39	0	17	463	0	55	679	0
Confl. Peds. (#/hr)	17					17	26		18	18		26
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	2%	0%	4%	0%	0%	4%	6%	4%	8%	2%	3%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			24.0		67.0	67.0		67.0	67.0	
Effective Green, g (s)		24.0			24.0		67.0	67.0		67.0	67.0	
Actuated g/C Ratio		0.24			0.24		0.67	0.67		0.67	0.67	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		354			370		377	1761		506	1756	
v/s Ratio Prot								0.18			c0.26	
v/s Ratio Perm		c0.07			0.03		0.03			0.07		
v/c Ratio		0.28			0.10		0.05	0.26		0.11	0.39	
Uniform Delay, d1		31.0			29.6		5.6	6.6		5.9	7.3	
Progression Factor		1.00			1.00		0.63	0.54		0.76	0.59	
Incremental Delay, d2		2.0			0.6		0.2	0.4		0.3	0.5	
Delay (s)		33.0			30.2		3.8	3.9		4.8	4.9	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		33.0			30.2			3.9			4.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1139: Ashland Ave. □ W 50th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Volume (vph)	19	6	16	14	9	35	10	412	8	19	627	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.97			0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			0.99		0.96	1.00		0.96	1.00	
Frt		0.95			0.92		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611			1585		1527	2635		1531	2991	
Flt Permitted		0.89			0.94		0.36	1.00		0.49	1.00	
Satd. Flow (perm)		1460			1513		583	2635		784	2991	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	6	17	15	9	37	11	434	8	20	660	25
RTOR Reduction (vph)	0	13	0	0	27	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	30	0	0	34	0	11	441	0	20	682	0
Confl. Peds. (#/hr)	13		40	40		13	42		25	25		42
Confl. Bikes (#/hr)			1						2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	4%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.0			26.0		65.0	65.0		65.0	65.0	
Effective Green, g (s)		26.0			26.0		65.0	65.0		65.0	65.0	
Actuated g/C Ratio		0.26			0.26		0.65	0.65		0.65	0.65	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		379			393		378	1712		509	1944	
v/s Ratio Prot								0.17			c0.23	
v/s Ratio Perm		0.02			c0.02		0.02			0.03		
v/c Ratio		0.08			0.09		0.03	0.26		0.04	0.35	
Uniform Delay, d1		28.0			28.0		6.2	7.4		6.3	7.9	
Progression Factor		1.00			1.00		0.85	0.79		0.79	0.62	
Incremental Delay, d2		0.4			0.4		0.1	0.4		0.1	0.5	
Delay (s)		28.4			28.4		5.4	6.2		5.1	5.4	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		28.4			28.4			6.1			5.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1140: Ashland Ave. □ W 51st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱	↱	↰	↑↑	↱
Volume (vph)	86	194	46	54	273	44	37	337	26	29	529	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.93	1.00	1.00	0.95	1.00	1.00	0.94
Flpb, ped/bikes	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1478	1631	1354	1494	1527	1308	1626	2544	822	1570	2623	849
Flt Permitted	0.45	1.00	1.00	0.57	1.00	1.00	0.41	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	707	1631	1354	890	1527	1308	701	2544	822	856	2623	849
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	204	48	57	287	46	39	355	27	31	557	80
RTOR Reduction (vph)	0	0	32	0	0	29	0	0	10	0	0	34
Lane Group Flow (vph)	91	204	16	57	287	17	39	358	14	31	557	46
Confl. Peds. (#/hr)	29		21	21		29	13		20	20		13
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	5%	3%	0%	4%	10%	2%	0%	5%	4%	3%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.0	34.0	34.0	34.0	34.0	34.0	57.0	57.0	57.0	57.0	57.0	57.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0	57.0	57.0	57.0	57.0	57.0	57.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	240	554	460	302	519	444	399	1450	468	487	1495	483
v/s Ratio Prot		0.13			c0.19			0.14			c0.21	
v/s Ratio Perm	0.13		0.01	0.06		0.01	0.06		0.02	0.04		0.05
v/c Ratio	0.38	0.37	0.04	0.19	0.55	0.04	0.10	0.25	0.03	0.06	0.37	0.09
Uniform Delay, d1	25.0	24.9	22.0	23.3	26.8	22.1	9.8	10.8	9.4	9.6	11.7	9.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.44	1.30	2.59
Incremental Delay, d2	4.5	1.9	0.1	1.4	4.2	0.2	0.5	0.4	0.1	0.2	0.7	0.4
Delay (s)	29.5	26.8	22.2	24.7	31.0	22.2	10.3	11.2	9.5	14.0	15.9	25.6
Level of Service	C	C	C	C	C	C	B	B	A	B	B	C
Approach Delay (s)		26.9			29.1			11.0			17.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1142: Ashland Ave. □ W 53rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↱		↰	↑↱	
Volume (vph)	0	0	0	16	3	13	14	400	4	10	616	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	10	11	12	10	11	12
Total Lost time (s)					5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor					1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes					0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes					0.98		1.00	1.00		0.94	1.00	
Frt					0.94		1.00	1.00		1.00	1.00	
Flt Protected					0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1555		1485	2728		1508	2648	
Flt Permitted					0.98		0.37	1.00		0.50	1.00	
Satd. Flow (perm)					1555		571	2728		786	2648	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	17	3	14	15	421	4	11	648	20
RTOR Reduction (vph)	0	0	0	0	10	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	24	0	15	424	0	11	666	0
Confl. Peds. (#/hr)	12		41	41		12	4		30	30		4
Confl. Bikes (#/hr)			4						3			1
Heavy Vehicles (%)	0%	0%	0%	6%	0%	0%	7%	4%	0%	0%	3%	5%
Parking (#/hr)								36			48	
Turn Type				Perm	NA		Perm	NA		Perm	NA	
Protected Phases					8			2			6	
Permitted Phases				8			2			6		
Actuated Green, G (s)					26.0		55.0	55.0		55.0	55.0	
Effective Green, g (s)					26.0		55.0	55.0		55.0	55.0	
Actuated g/C Ratio					0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)					5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)					449		348	1667		480	1618	
v/s Ratio Prot								0.16			c0.25	
v/s Ratio Perm					0.02		0.03			0.01		
v/c Ratio					0.05		0.04	0.25		0.02	0.41	
Uniform Delay, d1					23.1		7.0	8.1		6.9	9.1	
Progression Factor					1.00		1.11	1.48		1.00	1.00	
Incremental Delay, d2					0.2		0.2	0.4		0.1	0.8	
Delay (s)					23.3		8.0	12.3		7.0	9.9	
Level of Service					C		A	B		A	A	
Approach Delay (s)		0.0			23.3			12.1			9.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱	↰	↑↑			↑↑	↱
Volume (vph)	0	0	0	156	815	63	69	354	0	0	543	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	9	11	11	10	10	10
Total Lost time (s)				5.0	5.0	5.0	5.0	3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.95	1.00	1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1494	3129	1333	1535	2935			2624	951
Flt Permitted				0.95	1.00	1.00	0.35	1.00			1.00	1.00
Satd. Flow (perm)				1494	3129	1333	568	2935			2624	951
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	164	858	66	73	373	0	0	572	86
RTOR Reduction (vph)	0	0	0	0	0	38	0	0	0	0	0	50
Lane Group Flow (vph)	0	0	0	164	858	28	73	373	0	0	572	36
Confl. Peds. (#/hr)	41					41	19		29	29		19
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	3%	2%	2%	0%	7%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	8
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm	custom	NA			NA	Perm
Protected Phases					8		5	2 5			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)				34.0	34.0	34.0	43.0	46.0			38.0	38.0
Effective Green, g (s)				34.0	34.0	34.0	43.0	46.0			38.0	38.0
Actuated g/C Ratio				0.38	0.38	0.38	0.48	0.51			0.42	0.42
Clearance Time (s)				5.0	5.0	5.0	5.0				3.0	3.0
Lane Grp Cap (vph)				564	1182	503	325	1500			1107	401
v/s Ratio Prot					c0.27		0.01	c0.13			c0.22	
v/s Ratio Perm				0.11		0.02	0.09					0.04
v/c Ratio				0.29	0.73	0.06	0.22	0.25			0.52	0.09
Uniform Delay, d1				19.6	24.0	17.8	18.4	12.3			19.2	15.6
Progression Factor				1.00	1.00	1.00	0.28	0.29			0.61	0.87
Incremental Delay, d2				1.3	3.9	0.2	1.5	0.4			1.6	0.4
Delay (s)				20.9	27.9	18.0	6.7	4.0			13.3	13.9
Level of Service				C	C	B	A	A			B	B
Approach Delay (s)		0.0			26.3			4.4			13.4	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1145: Ashland Ave. □ W Garfield Blvd. (EB)

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑↑	↱					↑↑	↱	↰	↑↑	
Volume (vph)	54	658	111	0	0	0	0	391	123	63	681	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	10	9	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0	5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00					0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1509	3099	1319					2771	1064	1536	3020	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.46	1.00	
Satd. Flow (perm)	1509	3099	1319					2771	1064	736	3020	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	693	117	0	0	0	0	412	129	66	717	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	75	0	0	0
Lane Group Flow (vph)	57	693	79	0	0	0	0	412	54	66	717	0
Confl. Peds. (#/hr)			31	31			23		8	8		23
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	3%	4%	0%	0%	0%	0%	5%	0%	0%	4%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm	custom	NA	
Protected Phases		4						2		1	1 6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)	34.0	34.0	34.0					38.0	38.0	43.0	46.0	
Effective Green, g (s)	34.0	34.0	34.0					38.0	38.0	43.0	43.0	
Actuated g/C Ratio	0.38	0.38	0.38					0.42	0.42	0.48	0.48	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0	5.0		
Lane Grp Cap (vph)	570	1170	498					1169	449	396	1442	
v/s Ratio Prot		c0.22						0.15		0.01	c0.24	
v/s Ratio Perm	0.04		0.06						0.05	0.07		
v/c Ratio	0.10	0.59	0.16					0.35	0.12	0.17	0.50	
Uniform Delay, d1	18.1	22.4	18.5					17.6	15.8	15.8	16.1	
Progression Factor	1.00	1.00	1.00					2.20	6.66	0.54	0.52	
Incremental Delay, d2	0.4	2.2	0.7					0.8	0.5	0.8	1.1	
Delay (s)	18.5	24.7	19.2					39.6	106.0	9.3	9.5	
Level of Service	B	C	B					D	F	A	A	
Approach Delay (s)		23.5			0.0			55.5			9.5	
Approach LOS		C			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1148: Ashland Ave. □ W 57th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↑↱		↰	↑↑	
Volume (vph)	16	12	46	0	0	0	0	443	20	12	643	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	10	11	11
Total Lost time (s)		5.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		1.00	0.95	
Frpb, ped/bikes		0.98						1.00		1.00	1.00	
Flpb, ped/bikes		0.99						1.00		0.96	1.00	
Frt		0.92						0.99		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		1585						2703		1539	2638	
Flt Permitted		0.99						1.00		0.46	1.00	
Satd. Flow (perm)		1585						2703		741	2638	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	13	48	0	0	0	0	466	21	13	677	0
RTOR Reduction (vph)	0	34	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	44	0	0	0	0	0	483	0	13	677	0
Confl. Peds. (#/hr)	42		16	16		42	29		22	22		29
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	4%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		27.0						54.0		54.0	54.0	
Effective Green, g (s)		27.0						54.0		54.0	54.0	
Actuated g/C Ratio		0.30						0.60		0.60	0.60	
Clearance Time (s)		5.0						4.0		4.0	4.0	
Lane Grp Cap (vph)		475						1621		444	1582	
v/s Ratio Prot								0.18			c0.26	
v/s Ratio Perm		0.03								0.02		
v/c Ratio		0.09						0.30		0.03	0.43	
Uniform Delay, d1		22.7						8.8		7.3	9.7	
Progression Factor		1.00						0.71		0.29	0.20	
Incremental Delay, d2		0.4						0.5		0.1	0.8	
Delay (s)		23.1						6.6		2.2	2.8	
Level of Service		C						A		A	A	
Approach Delay (s)		23.1			0.0			6.6			2.8	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1150: Ashland Ave. □ W 59th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	79	214	61	103	356	34	68	426	64	41	730	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.79	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	0.92	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1578	1541	1074	1475	1585	1358	1577	2813	1102	1596	3020	1195
Flt Permitted	0.41	1.00	1.00	0.58	1.00	1.00	0.25	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	686	1541	1074	896	1585	1358	409	2813	1102	735	3020	1195
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	83	225	64	108	375	36	72	448	67	43	768	54
RTOR Reduction (vph)	0	0	37	0	0	21	0	0	40	0	0	32
Lane Group Flow (vph)	83	225	27	108	375	15	72	448	27	43	768	22
Confl. Peds. (#/hr)	5		120	120		5	19					19
Heavy Vehicles (%)	1%	9%	5%	0%	6%	3%	0%	4%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	41.6	37.6	37.6	41.6	37.6	37.6	36.4	36.4	36.4	36.4	36.4	36.4
Effective Green, g (s)	41.6	37.6	37.6	41.6	37.6	37.6	36.4	36.4	36.4	36.4	36.4	36.4
Actuated g/C Ratio	0.46	0.42	0.42	0.46	0.42	0.42	0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	356	643	448	439	662	567	165	1137	445	297	1221	483
v/s Ratio Prot	0.01	0.15		c0.01	c0.24			0.16			c0.25	
v/s Ratio Perm	0.10		0.02	0.10		0.01	0.18		0.02	0.06		0.02
v/c Ratio	0.23	0.35	0.06	0.25	0.57	0.03	0.44	0.39	0.06	0.14	0.63	0.05
Uniform Delay, d1	14.2	17.9	15.6	14.1	20.0	15.4	19.4	19.0	16.4	17.0	21.4	16.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.44	0.38	0.47	0.38	0.46	0.16
Incremental Delay, d2	0.3	1.5	0.3	0.3	3.5	0.1	7.9	1.0	0.3	1.0	2.4	0.2
Delay (s)	14.5	19.4	15.9	14.4	23.5	15.5	16.5	8.3	8.0	7.5	12.2	2.7
Level of Service	B	B	B	B	C	B	B	A	A	A	B	A
Approach Delay (s)		17.7			21.0			9.3			11.4	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↑↱		↰	↑↑	
Volume (vph)	19	9	50	0	0	0	0	507	24	13	790	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		1.00	0.95	
Frpb, ped/bikes		0.98						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.95	1.00	
Frt		0.91						0.99		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		1798						2785		1565	2616	
Flt Permitted		0.99						1.00		0.42	1.00	
Satd. Flow (perm)		1798						2785		688	2616	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	9	53	0	0	0	0	534	25	14	832	0
RTOR Reduction (vph)	0	37	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	0	0	0	555	0	14	832	0
Confl. Peds. (#/hr)	10		16	16		10	28		38	38		28
Confl. Bikes (#/hr)									1			3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		27.0						54.0		54.0	54.0	
Effective Green, g (s)		27.0						54.0		54.0	54.0	
Actuated g/C Ratio		0.30						0.60		0.60	0.60	
Clearance Time (s)		5.0						4.0		4.0	4.0	
Lane Grp Cap (vph)		539						1671		412	1569	
v/s Ratio Prot								0.20			c0.32	
v/s Ratio Perm		0.02								0.02		
v/c Ratio		0.08						0.33		0.03	0.53	
Uniform Delay, d1		22.6						9.0		7.3	10.6	
Progression Factor		1.00						0.45		0.76	1.38	
Incremental Delay, d2		0.3						0.5		0.1	1.1	
Delay (s)		22.9						4.5		5.7	15.7	
Level of Service		C						A		A	B	
Approach Delay (s)		22.9			0.0			4.5			15.5	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1154: Ashland Ave. □ W 63rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↑↑	↱	↰	↑↱	
Volume (vph)	45	353	90	87	398	47	103	427	64	58	853	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0	5.0	3.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.99		1.00	1.00	0.70	1.00	0.97	
Flpb, ped/bikes	0.97	1.00	1.00	0.97	1.00		1.00	1.00	1.00	0.94	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1446	1600	1307	1529	1609		1457	3020	854	1424	2606	
Flt Permitted	0.27	1.00	1.00	0.38	1.00		0.17	1.00	1.00	0.46	1.00	
Satd. Flow (perm)	410	1600	1307	610	1609		258	3020	854	691	2606	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	372	95	92	419	49	108	449	67	61	898	118
RTOR Reduction (vph)	0	0	39	0	4	0	0	0	37	0	11	0
Lane Group Flow (vph)	47	372	56	92	464	0	108	449	30	61	1005	0
Confl. Peds. (#/hr)	86		72	72		86	122		129	129		122
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	7%	5%	1%	1%	2%	0%	9%	4%	5%	5%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	0
Parking (#/hr)								0	0		36	
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0		44.0	40.0	40.0	44.0	40.0	
Effective Green, g (s)	33.0	33.0	33.0	33.0	33.0		44.0	40.0	40.0	44.0	40.0	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.49	0.44	0.44	0.49	0.44	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	5.0	5.0	3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	150	586	479	223	589		179	1342	379	370	1158	
v/s Ratio Prot		0.23			c0.29		c0.03	0.15		0.01	c0.39	
v/s Ratio Perm	0.11		0.04	0.15			0.27		0.03	0.07		
v/c Ratio	0.31	0.63	0.12	0.41	0.79		0.60	0.33	0.08	0.16	0.87	
Uniform Delay, d1	20.4	23.5	18.9	21.3	25.4		14.6	16.3	14.4	12.3	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.98	0.71	0.59	1.47	1.09	
Incremental Delay, d2	5.4	5.2	0.5	5.6	10.2		5.6	0.7	0.4	0.2	8.4	
Delay (s)	25.8	28.7	19.4	26.8	35.6		20.0	12.2	9.0	18.3	33.0	
Level of Service	C	C	B	C	D		B	B	A	B	C	
Approach Delay (s)		26.7			34.1			13.2			32.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1156: Ashland Ave. □ W 65th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑↑			↑↱	
Volume (vph)	0	0	0	11	4	27	23	508	0	0	879	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	10	11	11	11	11	11
Total Lost time (s)					5.0		4.0	4.0			4.0	
Lane Util. Factor					1.00		1.00	0.95			0.95	
Frpb, ped/bikes					0.98		1.00	1.00			0.99	
Flpb, ped/bikes					0.99		0.96	1.00			1.00	
Frt					0.91		1.00	1.00			1.00	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					1742		1479	2969			2735	
Flt Permitted					0.99		0.29	1.00			1.00	
Satd. Flow (perm)					1742		456	2969			2735	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	12	4	28	24	535	0	0	925	31
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	18	0	24	535	0	0	955	0
Confl. Peds. (#/hr)	5		6	6		5	42		41	41		42
Confl. Bikes (#/hr)			1									3
Heavy Vehicles (%)	0%	0%	0%	9%	0%	0%	4%	3%	0%	0%	3%	0%
Parking (#/hr)								10			36	
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					5.7		75.3	75.3			75.3	
Effective Green, g (s)					5.7		75.3	75.3			75.3	
Actuated g/C Ratio					0.06		0.84	0.84			0.84	
Clearance Time (s)					5.0		4.0	4.0			4.0	
Vehicle Extension (s)					5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					110		381	2484			2288	
v/s Ratio Prot								0.18			c0.35	
v/s Ratio Perm					0.01		0.05					
v/c Ratio					0.16		0.06	0.22			0.42	
Uniform Delay, d1					39.9		1.3	1.5			1.8	
Progression Factor					1.00		0.43	0.39			0.23	
Incremental Delay, d2					1.4		0.3	0.2			0.4	
Delay (s)					41.3		0.8	0.8			0.8	
Level of Service					D		A	A			A	
Approach Delay (s)		0.0			41.3			0.8			0.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1158: Ashland Ave. □ W Marquette Rd.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	47	315	92	111	354	30	51	495	33	42	787	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.91	1.00	1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1504	1647	1329	1533	1680	1382	1502	2744	921	1576	2696	840
Flt Permitted	0.38	1.00	1.00	0.40	1.00	1.00	0.21	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	605	1647	1329	643	1680	1382	333	2744	921	680	2696	840
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	332	97	117	373	32	54	521	35	44	828	60
RTOR Reduction (vph)	0	0	63	0	0	21	0	0	21	0	0	37
Lane Group Flow (vph)	49	332	34	117	373	11	54	521	14	44	828	23
Confl. Peds. (#/hr)	21		22	22		21	32		32	32		32
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	2%	4%	0%	0%	0%	6%	3%	0%	0%	3%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	34.2	31.2	31.2	36.2	32.2	32.2	39.8	35.8	35.8	37.8	34.8	34.8
Effective Green, g (s)	34.2	31.2	31.2	36.2	32.2	32.2	39.8	35.8	35.8	37.8	34.8	34.8
Actuated g/C Ratio	0.38	0.35	0.35	0.40	0.36	0.36	0.44	0.40	0.40	0.42	0.39	0.39
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	259	570	460	298	601	494	199	1091	366	315	1042	324
v/s Ratio Prot	0.01	0.20		c0.02	c0.22		c0.01	0.19		0.00	c0.31	
v/s Ratio Perm	0.07		0.03	0.14		0.01	0.11		0.02	0.05		0.03
v/c Ratio	0.19	0.58	0.07	0.39	0.62	0.02	0.27	0.48	0.04	0.14	0.79	0.07
Uniform Delay, d1	18.4	24.1	19.7	18.6	23.9	18.7	15.7	20.1	16.6	15.7	24.4	17.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.13	1.21	1.00	1.73	1.53	6.40
Incremental Delay, d2	0.4	4.3	0.3	0.9	4.8	0.1	0.7	1.5	0.2	0.2	5.9	0.4
Delay (s)	18.7	28.4	20.0	19.5	28.6	18.8	18.4	25.8	16.8	27.3	43.4	111.9
Level of Service	B	C	C	B	C	B	B	C	B	C	D	F
Approach Delay (s)		25.7			26.0			24.6			47.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰	↱	↰	↑↱		↰	↑↱	
Volume (vph)	42	260	50	64	262	34	45	423	74	57	910	97
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	10	11	11	10	11	11
Total Lost time (s)		5.0			5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.89	1.00	0.99		1.00	0.98	
Flpb, ped/bikes		0.99			0.99	1.00	0.98	1.00		0.96	1.00	
Frt		0.98			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3055			1647	1273	1462	2611		1479	2503	
Flt Permitted		0.84			0.85	1.00	0.20	1.00		0.43	1.00	
Satd. Flow (perm)		2579			1416	1273	305	2611		671	2503	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	274	53	67	276	36	47	445	78	60	958	102
RTOR Reduction (vph)	0	15	0	0	0	17	0	16	0	0	9	0
Lane Group Flow (vph)	0	356	0	0	343	19	47	507	0	60	1051	0
Confl. Peds. (#/hr)	91		48	48		91	54		52	52		54
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	0%	3%	10%	0%	5%	3%	7%	3%	0%	4%	4%	2%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		30.0			30.0	30.0	51.0	51.0		51.0	51.0	
Effective Green, g (s)		30.0			30.0	30.0	51.0	51.0		51.0	51.0	
Actuated g/C Ratio		0.33			0.33	0.33	0.57	0.57		0.57	0.57	
Clearance Time (s)		5.0			5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		859			472	424	172	1479		380	1418	
v/s Ratio Prot								0.19			c0.42	
v/s Ratio Perm		0.14			c0.24	0.02	0.15			0.09		
v/c Ratio		0.41			0.73	0.05	0.27	0.34		0.16	0.74	
Uniform Delay, d1		23.2			26.4	20.3	10.0	10.5		9.3	14.6	
Progression Factor		1.00			1.00	1.00	2.17	2.27		0.31	0.45	
Incremental Delay, d2		1.5			9.4	0.2	3.7	0.6		0.7	2.9	
Delay (s)		24.7			35.8	20.5	25.4	24.4		3.6	9.5	
Level of Service		C			D	C	C	C		A	A	
Approach Delay (s)		24.7			34.4			24.5			9.2	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. □ W 71st St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	55	273	69	105	324	84	60	473	23	110	920	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.93	1.00	1.00	0.91
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1524	1647	1366	1553	1663	1342	1563	2969	1132	1567	3049	1171
Flt Permitted	0.36	1.00	1.00	0.44	1.00	1.00	0.18	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	582	1647	1366	718	1663	1342	289	2969	1132	684	3049	1171
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	287	73	111	341	88	63	498	24	116	968	82
RTOR Reduction (vph)	0	0	51	0	0	59	0	0	13	0	0	46
Lane Group Flow (vph)	58	287	22	111	341	29	63	498	11	116	968	36
Confl. Peds. (#/hr)	38		31	31		38	29		20	20		29
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	2%	0%	2%	1%	1%	2%	3%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	31.6	27.6	27.6	31.6	27.6	27.6	43.4	39.4	39.4	43.4	39.4	39.4
Effective Green, g (s)	31.6	27.6	27.6	31.6	27.6	27.6	43.4	39.4	39.4	43.4	39.4	39.4
Actuated g/C Ratio	0.35	0.31	0.31	0.35	0.31	0.31	0.48	0.44	0.44	0.48	0.44	0.44
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	246	505	418	289	509	411	195	1299	495	369	1334	512
v/s Ratio Prot	0.01	0.17		c0.02	c0.21		c0.01	0.17		0.01	c0.32	
v/s Ratio Perm	0.07		0.02	0.12		0.02	0.14		0.01	0.14		0.03
v/c Ratio	0.24	0.57	0.05	0.38	0.67	0.07	0.32	0.38	0.02	0.31	0.73	0.07
Uniform Delay, d1	20.2	26.2	22.0	21.3	27.2	22.1	14.2	17.1	14.4	13.2	20.8	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.49	1.00	0.59	0.49	0.33
Incremental Delay, d2	0.5	4.6	0.2	0.9	6.9	0.3	0.9	0.8	0.1	0.4	2.6	0.2
Delay (s)	20.7	30.8	22.2	22.1	34.1	22.4	10.5	9.3	14.4	8.1	12.7	5.0
Level of Service	C	C	C	C	C	C	B	A	B	A	B	A
Approach Delay (s)		27.9			29.7			9.6			11.7	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1168: Ashland Ave. □ W 74th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Volume (vph)	23	121	60	43	185	48	35	508	25	55	908	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	10	11	11	10	10	10
Total Lost time (s)		5.0	5.0		5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.94		1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	0.98	1.00		0.98	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1581	1303		1613	1392	1306	3017		1459	2883	
Flt Permitted		0.93	1.00		0.92	1.00	0.21	1.00		0.41	1.00	
Satd. Flow (perm)		1484	1303		1498	1392	291	3017		630	2883	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	24	127	63	45	195	51	37	535	26	58	956	63
RTOR Reduction (vph)	0	0	42	0	0	25	0	4	0	0	5	0
Lane Group Flow (vph)	0	151	21	0	240	26	37	557	0	58	1014	0
Confl. Peds. (#/hr)	12		44	44		12	44		19	19		44
Heavy Vehicles (%)	4%	10%	3%	0%	3%	0%	20%	3%	4%	7%	3%	8%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		30.0	30.0		30.0	30.0	51.0	51.0		51.0	51.0	
Effective Green, g (s)		30.0	30.0		30.0	30.0	51.0	51.0		51.0	51.0	
Actuated g/C Ratio		0.33	0.33		0.33	0.33	0.57	0.57		0.57	0.57	
Clearance Time (s)		5.0	5.0		5.0	5.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		494	434		499	464	164	1709		357	1633	
v/s Ratio Prot								0.18			c0.35	
v/s Ratio Perm		0.10	0.02		c0.16	0.02	0.13			0.09		
v/c Ratio		0.31	0.05		0.48	0.06	0.23	0.33		0.16	0.62	
Uniform Delay, d1		22.3	20.3		23.8	20.4	9.7	10.4		9.3	13.0	
Progression Factor		1.00	1.00		1.00	1.00	1.96	1.94		0.21	0.37	
Incremental Delay, d2		1.6	0.2		3.3	0.2	3.1	0.5		0.8	1.4	
Delay (s)		23.9	20.5		27.1	20.6	22.1	20.6		2.8	6.2	
Level of Service		C	C		C	C	C	C		A	A	
Approach Delay (s)		22.9			26.0			20.7			6.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1170: Ashland Ave. □ W 76th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱		↰	↑↱		↰	↑↱	
Volume (vph)	27	224	35	88	272	71	51	411	64	84	807	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	10	11	11
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.98		1.00	0.98		1.00	0.99	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3022			3014		1561	2748		1574	2692	
Flt Permitted		0.89			0.80		0.25	1.00		0.44	1.00	
Satd. Flow (perm)		2691			2445		405	2748		729	2692	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	236	37	93	286	75	54	433	67	88	849	55
RTOR Reduction (vph)	0	12	0	0	18	0	0	14	0	0	5	0
Lane Group Flow (vph)	0	289	0	0	436	0	54	486	0	88	899	0
Confl. Peds. (#/hr)	6		20	20		6	8		5	5		8
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	4%	3%	0%	1%	2%	1%	2%	4%	0%	1%	4%	2%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			32.0		49.0	49.0		49.0	49.0	
Effective Green, g (s)		32.0			32.0		49.0	49.0		49.0	49.0	
Actuated g/C Ratio		0.36			0.36		0.54	0.54		0.54	0.54	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		956			869		220	1496		396	1465	
v/s Ratio Prot								0.18			c0.33	
v/s Ratio Perm		0.11			c0.18		0.13			0.12		
v/c Ratio		0.30			0.50		0.25	0.33		0.22	0.61	
Uniform Delay, d1		20.9			22.7		10.8	11.3		10.6	14.0	
Progression Factor		1.00			1.00		0.65	0.61		0.42	0.34	
Incremental Delay, d2		0.8			2.1		2.6	0.6		1.1	1.6	
Delay (s)		21.8			24.8		9.6	7.5		5.6	6.4	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		21.8			24.8			7.7			6.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1173: Ashland Ave. □ W 79th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↱	↱	↰	↑↑	↱
Volume (vph)	75	379	30	63	439	67	62	368	57	48	826	96
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	10	11	11	10	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.94	1.00	1.00	0.82	1.00	1.00	0.92
Flpb, ped/bikes	0.98	1.00	1.00	0.96	1.00	1.00	0.99	1.00	1.00	0.91	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1494	1570	1235	1474	1585	1279	1575	2592	760	1371	2712	897
Flt Permitted	0.26	1.00	1.00	0.34	1.00	1.00	0.24	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	415	1570	1235	523	1585	1279	395	2592	760	711	2712	897
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	399	32	66	462	71	65	387	60	51	869	101
RTOR Reduction (vph)	0	0	21	0	0	46	0	1	29	0	0	39
Lane Group Flow (vph)	79	399	11	66	462	25	65	392	25	51	869	62
Confl. Peds. (#/hr)	54		99	99		54	27		68	68		27
Confl. Bikes (#/hr)			1			1			1			
Heavy Vehicles (%)	1%	7%	0%	0%	6%	1%	0%	4%	0%	6%	3%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	32.0	32.0	32.0	32.0	32.0	32.0	42.0	42.0	42.0	42.0	42.0	42.0
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	42.0	42.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	147	558	439	185	563	454	184	1209	354	331	1265	418
v/s Ratio Prot		0.25			c0.29			0.15			c0.32	
v/s Ratio Perm	0.19		0.01	0.13		0.02	0.16		0.03	0.07		0.07
v/c Ratio	0.54	0.72	0.03	0.36	0.82	0.06	0.35	0.32	0.07	0.15	0.69	0.15
Uniform Delay, d1	23.1	25.1	18.9	21.4	26.4	19.1	15.3	15.1	13.2	13.8	18.8	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.53	1.52	5.24	0.55	0.52	0.22
Incremental Delay, d2	13.4	7.6	0.1	5.3	12.6	0.2	4.9	0.7	0.4	0.9	2.8	0.7
Delay (s)	36.5	32.7	19.0	26.7	39.0	19.3	28.4	23.5	69.7	8.6	12.6	3.7
Level of Service	D	C	B	C	D	B	C	C	E	A	B	A
Approach Delay (s)		32.4			35.3			29.0			11.5	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑↑			↑↱	
Volume (vph)	0	0	0	49	45	48	57	639	0	0	901	121
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	9	11	11	11	11	11
Total Lost time (s)					5.0	5.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes					1.00	0.96	1.00	1.00			0.98	
Flpb, ped/bikes					0.98	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.98	
Flt Protected					0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1591	1343	1480	2723			2514	
Flt Permitted					0.97	1.00	0.19	1.00			1.00	
Satd. Flow (perm)					1591	1343	302	2723			2514	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	52	47	51	60	673	0	0	948	127
RTOR Reduction (vph)	0	0	0	0	0	34	0	0	0	0	12	0
Lane Group Flow (vph)	0	0	0	0	99	17	60	673	0	0	1063	0
Confl. Peds. (#/hr)	25		31	31		25	51		62	62		51
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%	4%	2%	0%	0%	3%	2%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					30.0	30.0	51.0	51.0			51.0	
Effective Green, g (s)					30.0	30.0	51.0	51.0			51.0	
Actuated g/C Ratio					0.33	0.33	0.57	0.57			0.57	
Clearance Time (s)					5.0	5.0	4.0	4.0			4.0	
Lane Grp Cap (vph)					530	447	171	1543			1424	
v/s Ratio Prot								0.25			c0.42	
v/s Ratio Perm					0.06	0.01	0.20					
v/c Ratio					0.19	0.04	0.35	0.44			0.75	
Uniform Delay, d1					21.3	20.3	10.5	11.2			14.6	
Progression Factor					1.00	1.00	0.55	0.51			0.32	
Incremental Delay, d2					0.8	0.2	5.2	0.8			3.1	
Delay (s)					22.1	20.4	11.0	6.5			7.8	
Level of Service					C	C	B	A			A	
Approach Delay (s)		0.0			21.5			6.9			7.8	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1177: Ashland Ave. □ W 83rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	65	287	101	83	297	66	100	591	105	70	855	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	9	11	11	9	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	0.99		1.00	1.00	0.82	1.00	1.00	0.93
Flpb, ped/bikes	0.99	1.00	1.00	0.97	1.00		1.00	1.00	1.00	0.98	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1545	1631	1316	1552	3086		1535	2897	905	1412	2632	850
Flt Permitted	0.47	1.00	1.00	0.42	1.00		0.23	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	769	1631	1316	689	3086		369	2897	905	534	2632	850
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	302	106	87	313	69	105	622	111	74	900	62
RTOR Reduction (vph)	0	0	48	0	21	0	0	0	39	0	0	31
Lane Group Flow (vph)	68	302	58	87	361	0	105	622	72	74	900	31
Confl. Peds. (#/hr)	14		47	47		14	59		65	65		59
Heavy Vehicles (%)	2%	3%	2%	0%	0%	0%	0%	1%	0%	7%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0		50.1	44.5	44.5	49.9	44.4	44.4
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0		50.1	44.5	44.5	49.9	44.4	44.4
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.56	0.49	0.49	0.55	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	4.0	4.0	3.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	239	507	409	214	960		277	1432	447	349	1298	419
v/s Ratio Prot		c0.19			0.12		c0.02	0.21		0.01	c0.34	
v/s Ratio Perm	0.09		0.04	0.13			0.19		0.08	0.10		0.04
v/c Ratio	0.28	0.60	0.14	0.41	0.38		0.38	0.43	0.16	0.21	0.69	0.07
Uniform Delay, d1	23.4	26.2	22.3	24.4	24.2		10.6	14.6	12.5	9.7	17.6	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.87	1.31	1.95
Incremental Delay, d2	3.0	5.1	0.7	5.6	1.1		0.9	1.0	0.8	0.2	2.3	0.3
Delay (s)	26.4	31.3	23.1	30.1	25.3		11.4	15.6	13.3	8.7	25.2	23.6
Level of Service	C	C	C	C	C		B	B	B	A	C	C
Approach Delay (s)		28.8			26.2			14.8			24.0	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1179: Ashland Ave. □ W 85th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↑↱		↰	↑↑	
Volume (vph)	30	26	38	0	0	0	0	640	27	29	960	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	9	11	11
Total Lost time (s)		5.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		1.00	0.95	
Frpb, ped/bikes		0.99						1.00		1.00	1.00	
Flpb, ped/bikes		0.99						1.00		0.98	1.00	
Frt		0.95						0.99		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		1643						2715		1459	2696	
Flt Permitted		0.98						1.00		0.38	1.00	
Satd. Flow (perm)		1643						2715		583	2696	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	27	40	0	0	0	0	674	28	31	1011	0
RTOR Reduction (vph)	0	35	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	64	0	0	0	0	0	701	0	31	1011	0
Confl. Peds. (#/hr)	11		5	5		11	16		19	19		16
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	3%	3%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		10.1						68.9		68.9	68.9	
Effective Green, g (s)		10.1						68.9		68.9	68.9	
Actuated g/C Ratio		0.11						0.78		0.78	0.78	
Clearance Time (s)		5.0						4.0		4.0	4.0	
Vehicle Extension (s)		6.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		188						2125		456	2110	
v/s Ratio Prot								0.26			c0.37	
v/s Ratio Perm		0.04								0.05		
v/c Ratio		0.34						0.33		0.07	0.48	
Uniform Delay, d1		35.9						2.8		2.2	3.3	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		3.0						0.4		0.3	0.8	
Delay (s)		38.9						3.2		2.5	4.1	
Level of Service		D						A		A	A	
Approach Delay (s)		38.9			0.0			3.2			4.1	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. □ W 87th St.

8/8/2013

	⤴	→	⤵	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	90	757	174	109	918	132	212	544	77	98	698	115
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.94	1.00	1.00	0.90	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1579	3179	1278	1576	3210	1306	1563	2820	944	1487	2658	865
Flt Permitted	0.13	1.00	1.00	0.20	1.00	1.00	0.19	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	222	3179	1278	329	3210	1306	314	2820	944	570	2658	865
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	797	183	115	966	139	223	573	81	103	735	121
RTOR Reduction (vph)	0	0	77	0	0	56	0	0	53	0	0	60
Lane Group Flow (vph)	95	797	106	115	966	83	223	573	28	103	735	61
Confl. Peds. (#/hr)	39		56	56		39	22		78	78		22
Heavy Vehicles (%)	1%	4%	3%	1%	3%	3%	2%	2%	1%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	39.7	35.1	35.1	41.5	36.0	36.0	46.4	34.4	34.4	40.4	31.4	31.4
Effective Green, g (s)	39.7	35.1	35.1	41.5	36.0	36.0	46.4	34.4	34.4	40.4	31.4	31.4
Actuated g/C Ratio	0.40	0.35	0.35	0.42	0.36	0.36	0.46	0.34	0.34	0.40	0.31	0.31
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	0.2	3.0	3.0	0.2	3.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0
Lane Grp Cap (vph)	150	1115	448	205	1155	470	295	970	324	312	834	271
v/s Ratio Prot	c0.03	0.25		c0.03	c0.30		c0.09	0.20		0.03	c0.28	
v/s Ratio Perm	0.22		0.08	0.20		0.06	0.26		0.03	0.10		0.07
v/c Ratio	0.63	0.71	0.24	0.56	0.84	0.18	0.76	0.59	0.09	0.33	0.88	0.23
Uniform Delay, d1	21.6	28.1	23.0	20.0	29.3	21.9	19.0	27.0	22.2	19.2	32.5	25.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.3	3.9	1.2	2.1	7.3	0.8	12.4	2.6	0.5	1.3	12.9	1.9
Delay (s)	27.9	32.0	24.2	22.1	36.6	22.7	31.4	29.6	22.7	20.5	45.4	27.3
Level of Service	C	C	C	C	D	C	C	C	C	C	D	C
Approach Delay (s)		30.3			33.6			29.4			40.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. □ W 91st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Volume (vph)	10	3	34	19	3	27	5	710	40	28	990	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	9	11	11	9	11	11
Total Lost time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.97			0.97		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			0.99		1.00	1.00		0.98	1.00	
Frt		0.90			0.93		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1440			1468		1533	2564		1450	2707	
Flt Permitted		0.92			0.87		0.26	1.00		0.35	1.00	
Satd. Flow (perm)		1332			1307		416	2564		531	2707	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	3	36	20	3	28	5	747	42	29	1042	13
RTOR Reduction (vph)	0	33	0	0	25	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	17	0	0	26	0	5	787	0	29	1055	0
Confl. Peds. (#/hr)	11		9	9		11	6		18	18		6
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	4%	3%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.1			8.1		72.9	72.9		72.9	72.9	
Effective Green, g (s)		8.1			8.1		72.9	72.9		72.9	72.9	
Actuated g/C Ratio		0.09			0.09		0.81	0.81		0.81	0.81	
Clearance Time (s)		5.0			5.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		8.0			8.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		119			117		336	2076		430	2192	
v/s Ratio Prot								0.31			c0.39	
v/s Ratio Perm		0.01			c0.02		0.01			0.05		
v/c Ratio		0.14			0.22		0.01	0.38		0.07	0.48	
Uniform Delay, d1		37.8			38.0		1.6	2.3		1.7	2.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.4			4.0		0.1	0.5		0.3	0.8	
Delay (s)		40.2			42.0		1.7	2.9		2.0	3.4	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		40.2			42.0			2.9			3.4	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱	↱	↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	155	496	62	22	746	156	96	341	25	256	640	169
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	10	11	11	10	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	0.99		1.00	1.00	0.94	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1564	3009	1252	1586	3124		1593	3020	1210	1503	3049	1215
Flt Permitted	0.12	1.00	1.00	0.40	1.00		0.30	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	195	3009	1252	666	3124		507	3020	1210	689	3049	1215
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	522	65	23	785	164	101	359	26	269	674	178
RTOR Reduction (vph)	0	1	36	0	16	0	0	0	18	0	0	66
Lane Group Flow (vph)	163	528	22	23	933	0	101	359	8	269	674	112
Confl. Peds. (#/hr)	30		39	39		30	18		52	52		18
Heavy Vehicles (%)	2%	5%	2%	0%	2%	4%	0%	4%	0%	5%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	8	0	0	8
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	45.8	40.4	40.4	39.2	36.8		41.8	31.8	31.8	49.2	36.2	36.2
Effective Green, g (s)	45.8	40.4	40.4	39.2	36.8		41.8	31.8	31.8	49.2	36.2	36.2
Actuated g/C Ratio	0.44	0.38	0.38	0.37	0.35		0.40	0.30	0.30	0.47	0.34	0.34
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	3.0	3.0	4.0	3.0	3.0
Lane Grp Cap (vph)	163	1157	481	269	1094		305	914	366	434	1051	418
v/s Ratio Prot	c0.06	0.18		0.00	0.30		0.03	0.12		c0.08	c0.22	
v/s Ratio Perm	c0.38		0.02	0.03			0.10		0.01	0.21		0.09
v/c Ratio	1.00	0.46	0.05	0.09	0.85		0.33	0.39	0.02	0.62	0.64	0.27
Uniform Delay, d1	25.5	24.1	20.2	21.0	31.6		20.6	29.0	25.7	18.4	28.9	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	70.5	1.3	0.2	0.1	8.4		0.9	1.3	0.1	3.0	3.0	1.6
Delay (s)	96.0	25.4	20.4	21.1	40.0		21.5	30.2	25.8	21.4	31.9	26.4
Level of Service	F	C	C	C	D		C	C	C	C	C	C
Approach Delay (s)		40.4			39.6			28.2			28.5	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Build Alternative Level of Service Reports

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	56	92	48	0	0	0	0	722	36	0	660	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.95						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1416						1124			1208	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1416						1124			1208	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.97	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	62	101	53	0	0	0	0	793	40	0	725	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	216	0	0	0	0	0	833	0	0	733	0
Confl. Peds. (#/hr)	62		25			62			19			16
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	4%	3%	3%	2%	0%
Parking (#/hr)								44			38	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		22.0						100.0			100.0	
Effective Green, g (s)		22.0						100.0			100.0	
Actuated g/C Ratio		0.17						0.77			0.77	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		239						864			929	
v/s Ratio Prot								c0.74			0.61	
v/s Ratio Perm		0.15										
v/c Ratio		0.90						0.96			0.79	
Uniform Delay, d1		53.0						13.4			8.8	
Progression Factor		1.00						0.85			1.45	
Incremental Delay, d2		37.8						20.3			2.2	
Delay (s)		90.7						31.7			15.0	
Level of Service		F						C			B	
Approach Delay (s)		90.7			0.0			31.7			15.0	
Approach LOS		F			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1005: Ashland Ave. □ W Addison St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	175	566	65	136	507	31	0	354	47	0	616	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.92		1.00	0.93		1.00	0.82
Flpb, ped/bikes	0.98	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1500	1514	1363	1451	1558	1191		1143	810		1250	866
Flt Permitted	0.24	1.00	1.00	0.18	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	381	1514	1363	282	1558	1191		1143	810		1250	866
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	192	622	71	149	557	34	0	389	52	0	677	51
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	192	622	71	149	557	34	0	389	52	0	677	51
Confl. Peds. (#/hr)	28		11	11		28			16			49
Confl. Bikes (#/hr)			2			1			1			2
Heavy Vehicles (%)	1%	7%	0%	10%	4%	10%	8%	5%	17%	2%	3%	4%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	58.0	58.0	58.0	58.0	58.0	58.0		63.0	63.0		63.0	63.0
Effective Green, g (s)	58.0	58.0	58.0	58.0	58.0	58.0		63.0	63.0		63.0	63.0
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45		0.48	0.48		0.48	0.48
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	169	675	608	125	695	531		553	392		605	419
v/s Ratio Prot		0.41			0.36			0.34			c0.54	
v/s Ratio Perm	0.50		0.05	c0.53		0.03			0.06			0.06
v/c Ratio	1.14	0.92	0.12	1.19	0.80	0.06		0.70	0.13		1.12	0.12
Uniform Delay, d1	36.0	33.9	21.0	36.0	31.0	20.5		26.2	18.5		33.5	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.69	0.83		0.80	0.93
Incremental Delay, d2	110.5	18.1	0.1	141.1	6.6	0.1		6.2	0.6		66.6	0.3
Delay (s)	146.5	51.9	21.1	177.1	37.7	20.6		24.4	15.9		93.2	17.4
Level of Service	F	D	C	F	D	C		C	B		F	B
Approach Delay (s)		70.0			65.0			23.4			87.9	
Approach LOS		E			E			C			F	

Intersection Summary			
HCM 2000 Control Delay	66.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1007: Ashland Ave. □ W Roscoe St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↑	↱
Volume (vph)	0	0	0	92	197	64	0	464	0	0	614	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	4.0
Lane Util. Factor					1.00			1.00			1.00	1.00
Frpb, ped/bikes					0.97			1.00			1.00	0.87
Flpb, ped/bikes					0.99			1.00			1.00	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1606			1428			1126	841
Flt Permitted					0.99			1.00			1.00	1.00
Satd. Flow (perm)					1606			1428			1126	841
Peak-hour factor, PHF	0.95	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	101	216	70	0	510	0	0	675	60
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	387	0	0	510	0	0	675	60
Confl. Peds. (#/hr)			13	13		43			18			20
Confl. Bikes (#/hr)			2			1						4
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	6%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								6			48	48
Turn Type				Perm	NA			NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8								6
Actuated Green, G (s)					35.0			87.0			87.0	87.0
Effective Green, g (s)					35.0			87.0			87.0	87.0
Actuated g/C Ratio					0.27			0.67			0.67	0.67
Clearance Time (s)					4.0			4.0			4.0	4.0
Lane Grp Cap (vph)					432			955			753	562
v/s Ratio Prot								0.36			c0.60	
v/s Ratio Perm					0.24							0.07
v/c Ratio					0.90			0.53			0.90	0.11
Uniform Delay, d1					45.7			11.1			17.8	7.7
Progression Factor					1.00			1.46			0.40	0.62
Incremental Delay, d2					23.8			1.4			5.4	0.1
Delay (s)					69.5			17.6			12.4	4.9
Level of Service					E			B			B	A
Approach Delay (s)		0.0			69.5			17.6			11.8	
Approach LOS		A			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1009: Ashland Ave. □ W School St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	129	280	19	16	10	10	0	457	8	0	564	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			0.99	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.99			0.96			1.00			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1590			1523			1304			1493	
Flt Permitted		0.89			0.80			1.00			1.00	
Satd. Flow (perm)		1429			1247			1304			1493	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	142	308	21	18	11	11	0	502	9	0	620	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	471	0	0	40	0	0	511	0	0	660	0
Confl. Peds. (#/hr)	24		35	35		24			24			33
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	2%	0%	5%	0%	0%	0%	0%	5%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		51.0			51.0			71.0			71.0	
Effective Green, g (s)		51.0			51.0			71.0			71.0	
Actuated g/C Ratio		0.39			0.39			0.55			0.55	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		560			489			712			815	
v/s Ratio Prot								0.39			c0.44	
v/s Ratio Perm		c0.33			0.03							
v/c Ratio		0.84			0.08			0.72			0.81	
Uniform Delay, d1		35.8			24.8			22.0			24.0	
Progression Factor		1.00			1.00			0.35			0.53	
Incremental Delay, d2		14.2			0.3			0.6			3.8	
Delay (s)		50.0			25.1			8.3			16.6	
Level of Service		D			C			A			B	
Approach Delay (s)		50.0			25.1			8.3			16.6	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT
Lane Configurations		↱				↑	↱		↑	↱		↑
Volume (vph)	4	435	105	40	2	285	135	43	595	73	1	513
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	12	11	10	12	11	11	11	11
Total Lost time (s)		5.0				5.0	5.0		6.0	6.0		6.0
Lane Util. Factor		1.00				1.00	1.00		1.00	1.00		1.00
Frpb, ped/bikes		0.96				1.00	0.88		1.00	0.84		1.00
Flpb, ped/bikes		1.00				1.00	1.00		1.00	1.00		1.00
Frt		0.97				1.00	0.85		1.00	0.85		1.00
Flt Protected		1.00				1.00	1.00		1.00	1.00		1.00
Satd. Flow (prot)		1516				1706	1133		1293	916		1535
Flt Permitted		1.00				1.00	1.00		1.00	1.00		1.00
Satd. Flow (perm)		1513				1702	1133		1293	916		1535
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	4	478	115	44	2	313	148	47	654	80	1	564
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	641	0	0	0	315	195	0	654	81	0	564
Confl. Peds. (#/hr)			51		51		42			47		
Confl. Bikes (#/hr)			8									
Heavy Vehicles (%)	0%	7%	7%	5%	0%	2%	13%	5%	5%	3%	100%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	3	0	0
Parking (#/hr)									24	24		0
Turn Type	Perm	NA			Perm	NA	Perm		NA	Perm		NA
Protected Phases		10				14			2			6
Permitted Phases	10				14		14			2		
Actuated Green, G (s)		40.0				40.0	40.0		47.0	47.0		47.0
Effective Green, g (s)		40.0				40.0	40.0		47.0	47.0		47.0
Actuated g/C Ratio		0.31				0.31	0.31		0.36	0.36		0.36
Clearance Time (s)		5.0				5.0	5.0		6.0	6.0		6.0
Lane Grp Cap (vph)		465				523	348		467	331		554
v/s Ratio Prot									c0.51			0.37
v/s Ratio Perm		c0.42				0.19	0.17			0.09		
v/c Ratio		1.38				0.60	0.56		1.40	0.24		1.02
Uniform Delay, d1		45.0				38.2	37.6		41.5	29.1		41.5
Progression Factor		1.00				1.00	1.00		0.80	0.80		0.76
Incremental Delay, d2		183.4				5.1	6.4		189.1	1.2		33.9
Delay (s)		228.4				43.3	44.0		222.5	24.5		65.5
Level of Service		F				D	D		F	C		E
Approach Delay (s)		228.4				43.6			200.7			63.9
Approach LOS		F				D			F			E

Intersection Summary			
HCM 2000 Control Delay	162.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	111.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

Movement	SBR	SEL	SET	SER	SER2	NWL2	NWL	NWT	NWR	NWR2
Lane Configurations	↱	↰	↑↱				↰	↑↱		
Volume (vph)	24	27	342	111	1	7	16	240	61	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	9	11	11	11	12	9	11	11	11
Total Lost time (s)	6.0	6.0	6.0				6.0	6.0		
Lane Util. Factor	1.00	1.00	1.00				1.00	1.00		
Frpb, ped/bikes	0.94	1.00	1.00				1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00				1.00	1.00		
Frt	0.85	1.00	0.96				1.00	0.97		
Flt Protected	1.00	0.95	1.00				0.95	1.00		
Satd. Flow (prot)	1391	1386	1623				1539	1662		
Flt Permitted	1.00	0.18	1.00				0.15	1.00		
Satd. Flow (perm)	1391	261	1623				249	1662		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	26	30	376	122	1	8	18	264	67	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	26	30	499	0	0	0	26	334	0	0
Confl. Peds. (#/hr)	26									
Confl. Bikes (#/hr)										
Heavy Vehicles (%)	0%	11%	3%	4%	0%	0%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Turn Type	Perm	Perm	NA			Perm	Perm	NA		
Protected Phases			4					8		
Permitted Phases	6	4				8	8			
Actuated Green, G (s)	47.0	26.0	26.0				26.0	26.0		
Effective Green, g (s)	47.0	26.0	26.0				26.0	26.0		
Actuated g/C Ratio	0.36	0.20	0.20				0.20	0.20		
Clearance Time (s)	6.0	6.0	6.0				6.0	6.0		
Lane Grp Cap (vph)	502	52	324				49	332		
v/s Ratio Prot			c0.31					0.20		
v/s Ratio Perm	0.02	0.12					0.10			
v/c Ratio	0.05	0.58	1.54				0.53	1.01		
Uniform Delay, d1	27.0	47.0	52.0				46.5	52.0		
Progression Factor	1.02	1.00	1.00				1.00	1.00		
Incremental Delay, d2	0.1	39.2	258.0				35.5	50.9		
Delay (s)	27.5	86.2	310.0				82.1	102.9		
Level of Service	C	F	F				F	F		
Approach Delay (s)			297.3					101.4		
Approach LOS			F					F		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1012: Ashland Ave. □ W Barry Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↱	
Volume (vph)	0	0	0	146	179	5	0	633	0	0	591	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					1.00			1.00			0.97	
Flpb, ped/bikes					0.98			1.00			1.00	
Frt					1.00			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1919			1333			1220	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1919			1333			1220	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	160	197	5	0	696	0	0	649	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	362	0	0	696	0	0	716	0
Confl. Peds. (#/hr)			19	19		54			130			48
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	7%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								16			30	30
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					31.0			91.0			91.0	
Effective Green, g (s)					31.0			91.0			91.0	
Actuated g/C Ratio					0.24			0.70			0.70	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					457			933			854	
v/s Ratio Prot								0.52			c0.59	
v/s Ratio Perm					0.19							
v/c Ratio					0.79			0.75			0.84	
Uniform Delay, d1					46.5			12.2			14.2	
Progression Factor					1.00			0.33			1.16	
Incremental Delay, d2					13.2			4.2			1.0	
Delay (s)					59.6			8.2			17.4	
Level of Service					E			A			B	
Approach Delay (s)		0.0			59.6			8.2			17.4	
Approach LOS		A			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. □ W Wellington Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	52	141	112	0	0	0	0	524	35	0	568	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.95						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1656						1259			1433	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1656						1259			1433	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	57	155	123	0	0	0	0	576	38	0	624	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	335	0	0	0	0	0	614	0	0	636	0
Confl. Peds. (#/hr)	8		1			8			1			2
Heavy Vehicles (%)	4%	1%	0%	0%	0%	0%	2%	13%	0%	0%	4%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		38.0						84.0			84.0	
Effective Green, g (s)		38.0						84.0			84.0	
Actuated g/C Ratio		0.29						0.65			0.65	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		484						813			925	
v/s Ratio Prot								c0.49			0.44	
v/s Ratio Perm		0.20										
v/c Ratio		0.69						0.76			0.69	
Uniform Delay, d1		40.8						15.9			14.6	
Progression Factor		1.00						0.96			1.09	
Incremental Delay, d2		7.9						0.6			2.2	
Delay (s)		48.7						15.8			18.1	
Level of Service		D						B			B	
Approach Delay (s)		48.7			0.0			15.8			18.1	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1018: Ashland Ave. □ W Diversey Pkwy.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	184	733	75	144	480	68	0	602	79	0	995	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00	0.85		1.00	0.89		1.00	0.66
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1535	1615	1183	1580	1647	1137		716	522		1413	934
Flt Permitted	0.10	1.00	1.00	0.11	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	158	1615	1183	175	1647	1137		716	522		1413	934
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	202	805	82	158	527	75	0	662	87	0	1093	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	202	805	82	158	527	75	0	662	87	0	1093	63
Confl. Peds. (#/hr)	44		31	31		44			20			76
Confl. Bikes (#/hr)			5			2			3			1
Heavy Vehicles (%)	4%	4%	3%	1%	2%	3%	0%	7%	10%	4%	1%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								92	92		16	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	51.0	43.0	43.0	43.0	38.0	38.0		71.0	71.0		71.0	71.0
Effective Green, g (s)	51.0	43.0	43.0	43.0	38.0	38.0		71.0	71.0		71.0	71.0
Actuated g/C Ratio	0.39	0.33	0.33	0.33	0.29	0.29		0.55	0.55		0.55	0.55
Clearance Time (s)	3.0	4.0	4.0	3.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	167	534	391	111	481	332		391	285		771	510
v/s Ratio Prot	c0.09	c0.50		c0.05	0.32			c0.93			0.77	
v/s Ratio Perm	0.38		0.07	0.41		0.07			0.17			0.07
v/c Ratio	1.21	1.51	0.21	1.42	1.10	0.23		1.69	0.31		1.42	0.12
Uniform Delay, d1	34.4	43.5	31.3	41.9	46.0	34.9		29.5	16.1		29.5	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.30	1.54		0.78	0.94
Incremental Delay, d2	137.1	238.0	1.2	234.8	69.6	1.6		312.9	0.2		195.0	0.5
Delay (s)	171.5	281.5	32.5	276.7	115.6	36.4		351.4	25.0		218.0	13.9
Level of Service	F	F	C	F	F	D		F	C		F	B
Approach Delay (s)		242.3			141.2			313.5			206.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	225.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	114.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1019: Ashland Ave. □ W Wrightwood Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	205	98	102	128	15	0	634	53	0	677	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.99			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1530			1555			1151			1527	
Flt Permitted		0.95			0.52			1.00			1.00	
Satd. Flow (perm)		1458			829			1151			1527	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	35	225	108	112	141	16	0	697	58	0	744	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	368	0	0	269	0	0	755	0	0	771	0
Confl. Peds. (#/hr)	12		2	2		12			4			3
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	1%	2%	0%	0%	6%	6%	4%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			82.0			82.0	
Effective Green, g (s)		40.0			40.0			82.0			82.0	
Actuated g/C Ratio		0.31			0.31			0.63			0.63	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		448			255			726			963	
v/s Ratio Prot								c0.66			0.50	
v/s Ratio Perm		0.25			c0.32							
v/c Ratio		0.82			1.05			1.04			0.80	
Uniform Delay, d1		41.7			45.0			24.0			17.9	
Progression Factor		1.00			1.00			0.54			0.34	
Incremental Delay, d2		15.5			71.5			39.4			0.7	
Delay (s)		57.2			116.5			52.5			6.8	
Level of Service		E			F			D			A	
Approach Delay (s)		57.2			116.5			52.5			6.8	
Approach LOS		E			F			D			A	

Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1023: Ashland Ave. □ W Fullerton Ave.

8/8/2013

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	124	630	7	164	476	15	0	506	54	0	596	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0		2.0	5.0	5.0		5.0	5.0		5.0	2.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94		1.00	0.92		1.00	0.88
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1475	3034		1505	1631	1288		1431	1115		1535	1157
Flt Permitted	0.19	1.00		0.21	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	295	3034		329	1631	1288		1431	1115		1535	1157
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	136	692	8	180	523	16	0	556	59	0	655	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	136	700	0	180	523	16	0	556	59	0	655	125
Confl. Peds. (#/hr)	20		24	24		20			39			38
Confl. Bikes (#/hr)			5			1			2			3
Heavy Vehicles (%)	8%	5%	0%	2%	3%	0%	0%	7%	6%	9%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	pm+ov
Protected Phases	7	4		3	8			2 10			6	7
Permitted Phases	4			8		8			2 10			6
Actuated Green, G (s)	47.1	41.1		54.0	46.0	46.0		66.0	66.0		63.0	69.0
Effective Green, g (s)	47.1	41.1		54.0	46.0	46.0		64.0	64.0		63.0	69.0
Actuated g/C Ratio	0.36	0.32		0.42	0.35	0.35		0.49	0.49		0.48	0.53
Clearance Time (s)	2.0	5.0		2.0	5.0	5.0					5.0	2.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	161	959		235	577	455		704	548		743	614
v/s Ratio Prot	c0.04	0.23		c0.06	c0.32			c0.39			c0.43	0.01
v/s Ratio Perm	0.27			0.25		0.01			0.05			0.10
v/c Ratio	0.84	0.73		0.77	0.91	0.04		0.79	0.11		0.88	0.20
Uniform Delay, d1	37.8	39.5		27.4	40.0	27.5		27.4	17.7		30.1	16.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.17	0.20		1.05	1.11
Incremental Delay, d2	31.3	4.9		13.8	20.4	0.1		4.3	0.2		8.4	0.1
Delay (s)	69.0	44.4		41.2	60.3	27.6		9.0	3.8		40.1	18.0
Level of Service	E	D		D	E	C		A	A		D	B
Approach Delay (s)		48.4			54.8			8.5			36.6	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL2	WBT	WBR	NBT	NBR	SBT	SBR	SBR2	NEL
Lane Configurations												
Volume (vph)	4	615	176	18	209	46	542	32	731	11	1	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	11	11	11	11	11	11	11	11	11	16
Total Lost time (s)		5.0	5.0		5.0		5.0		5.0			
Lane Util. Factor		1.00	1.00		0.95		1.00		1.00			
Frpb, ped/bikes		1.00	0.96		1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00		1.00		1.00		1.00			
Frt		1.00	0.85		0.97		0.99		1.00			
Flt Protected		1.00	1.00		1.00		1.00		1.00			
Satd. Flow (prot)		1739	1417		3046		1425		1481			
Flt Permitted		1.00	1.00		0.79		1.00		1.00			
Satd. Flow (perm)		1737	1417		2408		1425		1481			
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.92
Adj. Flow (vph)	4	676	193	20	230	51	596	35	803	12	1	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	680	193	0	301	0	631	0	816	0	0	0
Confl. Peds. (#/hr)	2		14			2		4				
Heavy Vehicles (%)	0%	0%	0%	0%	5%	7%	9%	6%	2%	0%	0%	2%
Parking (#/hr)							0		6			
Turn Type	Perm	NA	Perm	Perm	NA		NA		NA			
Protected Phases		4			8		2		6			10
Permitted Phases	4		4	8								
Actuated Green, G (s)		58.0	58.0		58.0		62.0		62.0			
Effective Green, g (s)		58.0	58.0		58.0		62.0		62.0			
Actuated g/C Ratio		0.45	0.45		0.45		0.48		0.48			
Clearance Time (s)		5.0	5.0		5.0		5.0		5.0			
Vehicle Extension (s)		3.0	3.0		3.0		3.0		3.0			
Lane Grp Cap (vph)		774	632		1074		679		706			
v/s Ratio Prot							0.44		c0.55			
v/s Ratio Perm		c0.39	0.14		0.13							
v/c Ratio		0.88	0.31		0.28		0.93		1.16			
Uniform Delay, d1		32.8	23.1		22.8		31.9		34.0			
Progression Factor		1.00	1.00		1.00		1.00		0.66			
Incremental Delay, d2		13.5	1.2		0.7		21.0		78.7			
Delay (s)		46.3	24.3		23.4		52.9		101.1			
Level of Service		D	C		C		D		F			
Approach Delay (s)		41.4			23.4		52.9		101.1			0.0
Approach LOS		D			C		D		F			A

Intersection Summary			
HCM 2000 Control Delay	60.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	122.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↱			↱			↱	
Volume (vph)	48	226	3	152	263	14	0	551	86	0	671	104
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		0.95			1.00			1.00	
Frpb, ped/bikes		1.00	0.97		1.00			1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.98	
Flt Protected		0.99	1.00		0.98			1.00			1.00	
Satd. Flow (prot)		1664	1387		3114			1363			1481	
Flt Permitted		0.79	1.00		0.61			1.00			1.00	
Satd. Flow (perm)		1322	1387		1948			1363			1481	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	53	248	3	167	289	15	0	605	95	0	737	114
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	301	3	0	471	0	0	700	0	0	851	0
Confl. Peds. (#/hr)	4		4	4		4			2			7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	14%	2%	10%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		28.0	28.0		28.0			64.0			64.0	
Effective Green, g (s)		28.0	28.0		28.0			64.0			64.0	
Actuated g/C Ratio		0.28	0.28		0.28			0.64			0.64	
Clearance Time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Grp Cap (vph)		370	388		545			872			947	
v/s Ratio Prot								0.51			c0.57	
v/s Ratio Perm		0.23	0.00		c0.24							
v/c Ratio		0.81	0.01		0.99dl			0.80			0.90	
Uniform Delay, d1		33.6	26.0		34.2			13.3			15.3	
Progression Factor		1.00	1.00		1.00			0.43			1.00	
Incremental Delay, d2		17.6	0.0		16.5			4.8			13.1	
Delay (s)		51.1	26.0		50.7			10.6			28.3	
Level of Service		D	C		D			B			C	
Approach Delay (s)		50.9			50.7			10.6			28.3	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1026: Ashland Ave. □ N Elston Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↑	↱		↱			↱	
Volume (vph)	0	581	59	4	118	80	0	567	1	0	824	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0	3.0		4.0			3.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00	0.98		1.00	0.97		1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1647	1323		1943	1438		1506			1550	
Flt Permitted		1.00	1.00		0.86	1.00		1.00			1.00	
Satd. Flow (perm)		1647	1323		1679	1438		1506			1550	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	638	65	4	130	88	0	623	1	0	905	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	638	65	0	134	88	0	624	0	0	908	0
Confl. Peds. (#/hr)	9		10	10		9						
Heavy Vehicles (%)	0%	2%	2%	0%	5%	3%	0%	4%	0%	5%	1%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	custom		NA			NA	
Protected Phases		4			8	1		2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		37.0	37.0		37.0	41.0		48.0			56.0	
Effective Green, g (s)		37.0	37.0		37.0	41.0		48.0			56.0	
Actuated g/C Ratio		0.37	0.37		0.37	0.41		0.48			0.56	
Clearance Time (s)		4.0	4.0		4.0	3.0		4.0			3.0	
Lane Grp Cap (vph)		609	489		621	589		722			868	
v/s Ratio Prot		c0.39				0.01		0.41			c0.59	
v/s Ratio Perm			0.05		0.08	0.06						
v/c Ratio		1.05	0.13		0.22	0.15		0.86			1.05	
Uniform Delay, d1		31.5	20.9		21.6	18.5		23.1			22.0	
Progression Factor		1.00	1.00		1.00	1.00		0.56			1.21	
Incremental Delay, d2		49.5	0.6		0.8	0.5		7.7			33.5	
Delay (s)		81.0	21.4		22.4	19.1		20.6			60.0	
Level of Service		F	C		C	B		C			E	
Approach Delay (s)		75.5			21.1			20.6			60.0	
Approach LOS		E			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	50.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1027: Ashland Ave. □ W Armitage Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰		↰	↱			↑	↱
Volume (vph)	462	408	57	7	197	0	85	261	10	0	492	239
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.98			1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1542	1555			1933		1545	1332			1689	1265
Flt Permitted	0.24	1.00			0.97		0.19	1.00			1.00	1.00
Satd. Flow (perm)	389	1555			1880		317	1332			1689	1265
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	508	448	63	8	216	0	93	287	11	0	541	263
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	508	511	0	0	224	0	93	298	0	0	541	263
Confl. Peds. (#/hr)	11		2	2		11	7		3			7
Heavy Vehicles (%)	7%	6%	4%	14%	5%	0%	7%	16%	0%	11%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)								0				0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA			NA	pm+ov
Protected Phases	7	4			8		5	2			6	7
Permitted Phases	4			8			2					6
Actuated Green, G (s)	44.7	44.7			13.7		46.3	46.3			39.5	67.5
Effective Green, g (s)	44.7	44.7			13.7		46.3	46.3			39.5	67.5
Actuated g/C Ratio	0.45	0.45			0.14		0.46	0.46			0.40	0.68
Clearance Time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	496	695			257		205	616			667	853
v/s Ratio Prot	c0.29	0.33					0.02	c0.22			c0.32	0.09
v/s Ratio Perm	c0.17				0.12		0.19					0.12
v/c Ratio	1.02	0.74			0.87		0.45	0.48			0.81	0.31
Uniform Delay, d1	26.7	22.8			42.3		18.6	18.6			26.9	6.7
Progression Factor	1.00	1.00			1.00		1.16	1.04			1.40	1.02
Incremental Delay, d2	46.7	4.0			26.0		0.1	0.2			3.0	0.1
Delay (s)	73.4	26.8			68.3		21.7	19.6			40.6	6.9
Level of Service	E	C			E		C	B			D	A
Approach Delay (s)		50.0			68.3			20.1			29.5	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↱			↱	
Volume (vph)	0	279	20	100	122	4	0	497	91	0	440	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	0.90		0.99			0.97			0.98	
Flpb, ped/bikes		1.00	1.00		0.98			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.98	
Flt Protected		1.00	1.00		0.98			1.00			1.00	
Satd. Flow (prot)		1667	1308		1581			898			1468	
Flt Permitted		1.00	1.00		0.52			1.00			1.00	
Satd. Flow (perm)		1667	1308		838			898			1468	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	0	307	22	110	134	4	0	546	100	0	484	101
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	307	22	0	248	0	0	646	0	0	585	0
Confl. Peds. (#/hr)	159		27	27		159			52			28
Heavy Vehicles (%)	0%	8%	5%	6%	11%	0%	0%	8%	3%	50%	3%	0%
Parking (#/hr)								64			0	
Turn Type		NA	Perm	pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases			4	8								
Actuated Green, G (s)		31.0	31.0		31.0			60.0			60.0	
Effective Green, g (s)		31.0	31.0		31.0			60.0			60.0	
Actuated g/C Ratio		0.31	0.31		0.31			0.60			0.60	
Clearance Time (s)		5.0	5.0		5.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		516	405		259			538			880	
v/s Ratio Prot		0.18						c0.72			0.40	
v/s Ratio Perm			0.02		c0.30							
v/c Ratio		0.59	0.05		0.96			1.20			0.66	
Uniform Delay, d1		29.2	24.2		33.9			20.0			13.3	
Progression Factor		1.00	1.00		1.00			0.58			0.51	
Incremental Delay, d2		5.0	0.3		43.8			105.0			2.7	
Delay (s)		34.2	24.5		77.6			116.5			9.5	
Level of Service		C	C		E			F			A	
Approach Delay (s)		33.5			77.6			116.5			9.5	
Approach LOS		C			E			F			A	

Intersection Summary			
HCM 2000 Control Delay	61.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1030: Ashland Ave. □ W Wabansia Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	34	4	130	24	10	18	0	483	6	0	401	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.90			0.95			1.00			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1397			1103			1228			1513	
Flt Permitted		0.93			0.83			1.00			1.00	
Satd. Flow (perm)		1317			940			1228			1513	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	37	4	143	26	11	20	0	531	7	0	441	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	184	0	0	57	0	0	538	0	0	450	0
Confl. Peds. (#/hr)	1		20	20		1			4			1
Heavy Vehicles (%)	0%	0%	1%	42%	0%	56%	8%	9%	0%	0%	3%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		19.8			19.8			72.2			72.2	
Effective Green, g (s)		19.8			19.8			72.2			72.2	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		260			186			886			1092	
v/s Ratio Prot								c0.44			0.30	
v/s Ratio Perm		c0.14			0.06							
v/c Ratio		0.71			0.31			0.61			0.41	
Uniform Delay, d1		37.4			34.2			6.9			5.5	
Progression Factor		1.00			1.00			0.16			1.14	
Incremental Delay, d2		10.6			2.0			1.5			0.8	
Delay (s)		48.0			36.2			2.6			7.1	
Level of Service		D			D			A			A	
Approach Delay (s)		48.0			36.2			2.6			7.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1033: Ashland Ave. □ W North Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	84	684	33	92	455	19	0	521	88	0	516	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1338	2730		1508	3002			1129	971		1166	910
Flt Permitted	0.32	1.00		0.17	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	452	2730		266	3002			1129	971		1166	910
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	92	752	36	101	500	21	0	573	97	0	567	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	92	788	0	101	521	0	0	573	97	0	567	31
Confl. Peds. (#/hr)			13	13					10			27
Heavy Vehicles (%)	15%	12%	6%	2%	2%	0%	2%	14%	8%	0%	3%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	37.4	31.0		35.8	30.2			52.4	52.4		52.4	52.4
Effective Green, g (s)	37.4	31.0		35.8	30.2			52.4	52.4		52.4	52.4
Actuated g/C Ratio	0.37	0.31		0.36	0.30			0.52	0.52		0.52	0.52
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	225	846		164	906			591	508		610	476
v/s Ratio Prot	c0.03	c0.29		c0.03	0.17			c0.51			0.49	
v/s Ratio Perm	0.13			0.18					0.10			0.03
v/c Ratio	0.41	0.93		0.62	0.58			0.97	0.19		0.93	0.07
Uniform Delay, d1	21.5	33.5		23.6	29.5			23.0	12.6		22.1	11.7
Progression Factor	1.00	1.00		1.00	1.00			1.28	1.33		0.60	0.59
Incremental Delay, d2	1.2	18.2		6.7	2.7			25.8	0.6		21.9	0.2
Delay (s)	22.8	51.7		30.3	32.1			55.4	17.3		35.2	7.2
Level of Service	C	D		C	C			E	B		D	A
Approach Delay (s)		48.6			31.8			49.9			33.7	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1039: Ashland Ave. □ W Blackhawk St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	49	72	11	50	24	44	0	543	30	0	579	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	11	11	11	11	11	11
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.97			1.00			1.00	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.99			0.95			0.99			1.00	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1928			1549			1103			1386	
Flt Permitted		0.87			0.85			1.00			1.00	
Satd. Flow (perm)		1718			1340			1103			1386	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	54	79	12	55	26	48	0	597	33	0	636	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	145	0	0	129	0	0	630	0	0	648	0
Confl. Peds. (#/hr)	24		9	9		24			9			19
Heavy Vehicles (%)	0%	0%	9%	0%	0%	2%	4%	5%	0%	1%	5%	9%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			70.0			70.0	
Effective Green, g (s)		24.0			24.0			70.0			70.0	
Actuated g/C Ratio		0.24			0.24			0.70			0.70	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		412			321			772			970	
v/s Ratio Prot								c0.57			0.47	
v/s Ratio Perm		0.08			c0.10							
v/c Ratio		0.35			0.40			0.82			0.67	
Uniform Delay, d1		31.5			32.0			10.5			8.5	
Progression Factor		1.00			1.00			0.41			0.59	
Incremental Delay, d2		2.4			3.7			8.5			2.2	
Delay (s)		33.9			35.7			12.8			7.2	
Level of Service		C			D			B			A	
Approach Delay (s)		33.9			35.7			12.8			7.2	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1042: Ashland Ave. □ N Milwaukee Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↑	↱		↱			↱	
Volume (vph)	13	372	83	0	176	51	0	423	13	0	594	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	11	11	8	11	11	11
Total Lost time (s)	5.0	5.0			5.0	3.0		5.0			5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.93		1.00			1.00	
Flpb, ped/bikes	0.95	1.00			1.00	1.00		1.00			1.00	
Frt	1.00	0.97			1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1522	1601			1642	1252		1593			1520	
Flt Permitted	0.64	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)	1019	1601			1642	1252		1593			1520	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.91	0.91	0.90	0.91	0.91
Adj. Flow (vph)	14	409	91	0	193	56	0	465	14	0	653	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	14	500	0	0	193	56	0	479	0	0	653	0
Confl. Peds. (#/hr)	40		24			40			4			11
Heavy Vehicles (%)	0%	5%	5%	0%	6%	10%	8%	9%	0%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4					3 8						
Actuated Green, G (s)	36.0	36.0			40.0	40.0		50.0			50.0	
Effective Green, g (s)	36.0	36.0			40.0	40.0		50.0			50.0	
Actuated g/C Ratio	0.36	0.36			0.40	0.40		0.50			0.50	
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)	366	576			656	500		796			760	
v/s Ratio Prot		c0.31			c0.12			0.30			c0.43	
v/s Ratio Perm	0.01					0.04						
v/c Ratio	0.04	0.87			0.29	0.11		0.60			0.86	
Uniform Delay, d1	20.8	29.8			20.4	18.8		17.9			21.9	
Progression Factor	1.00	1.00			1.00	1.00		0.57			1.14	
Incremental Delay, d2	0.2	16.2			1.1	0.5		2.2			10.2	
Delay (s)	21.0	45.9			21.5	19.3		12.4			35.2	
Level of Service	C	D			C	B		B			D	
Approach Delay (s)		45.3			21.0			12.4			35.2	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	131	706	54	141	442	42	0	525	141	0	454	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.83	1.00	1.00	0.79		1.00	0.82		1.00	0.87
Flpb, ped/bikes	0.90	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1459	3179	1200	1631	3160	1124		1395	1149		1550	1147
Flt Permitted	0.48	1.00	1.00	0.15	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	729	3179	1200	253	3160	1124		1395	1149		1550	1147
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.93	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	144	776	59	155	486	46	0	577	155	0	499	124
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	144	776	59	155	486	46	0	577	155	0	499	124
Confl. Peds. (#/hr)	102		77	77		102			145			102
Confl. Bikes (#/hr)			7			1			1			1
Heavy Vehicles (%)	2%	4%	2%	1%	1%	0%	7%	6%	6%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.0	29.0	29.0	39.0	39.0	39.0		51.0	51.0		51.0	51.0
Effective Green, g (s)	29.0	29.0	29.0	39.0	39.0	39.0		51.0	51.0		51.0	51.0
Actuated g/C Ratio	0.29	0.29	0.29	0.39	0.39	0.39		0.51	0.51		0.51	0.51
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	211	921	348	195	1232	438		711	585		790	584
v/s Ratio Prot		0.24		c0.06	0.15			c0.41			0.32	
v/s Ratio Perm	0.20		0.05	c0.25		0.04			0.13			0.11
v/c Ratio	0.68	0.84	0.17	0.79	0.39	0.11		0.81	0.26		0.63	0.21
Uniform Delay, d1	31.4	33.4	26.5	22.9	22.0	19.4		20.5	13.9		17.7	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.99	0.97		0.23	0.27
Incremental Delay, d2	16.4	9.3	1.1	27.5	0.9	0.5		8.3	0.9		1.9	0.4
Delay (s)	47.9	42.6	27.6	50.5	22.9	19.9		28.5	14.3		5.9	4.1
Level of Service	D	D	C	D	C	B		C	B		A	A
Approach Delay (s)		42.5			28.9			25.5			5.6	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1049: Ashland Ave. □ W Augusta Blvd.

8/8/2013

	⤴	→	⤵	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↱			↱	
Volume (vph)	170	476	52	50	247	29	0	402	118	0	494	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.90		0.98			0.99	
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1524	1740	1400	1480	1647	1083		1205			1228	
Flt Permitted	0.43	1.00	1.00	0.12	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	695	1740	1400	190	1647	1083		1205			1228	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	187	523	57	55	271	32	0	442	130	0	543	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	187	523	57	55	271	32	0	572	0	0	634	0
Confl. Peds. (#/hr)	34		6	6		34			20			6
Heavy Vehicles (%)	0%	0%	2%	4%	2%	14%	0%	12%	2%	2%	4%	1%
Parking (#/hr)								20			30	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0		61.0			61.0	
Effective Green, g (s)	33.0	33.0	33.0	33.0	33.0	33.0		61.0			61.0	
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33		0.61			0.61	
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	229	574	462	62	543	357		735			749	
v/s Ratio Prot		c0.30			0.16			0.47			c0.52	
v/s Ratio Perm	0.27		0.04	0.29		0.03						
v/c Ratio	0.82	0.91	0.12	0.89	0.50	0.09		0.78			0.85	
Uniform Delay, d1	30.7	32.1	23.4	31.7	26.9	23.1		14.5			15.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			0.79	
Incremental Delay, d2	19.7	18.7	0.1	74.6	0.7	0.1		8.0			9.9	
Delay (s)	50.4	50.8	23.5	106.4	27.6	23.2		22.4			22.2	
Level of Service	D	D	C	F	C	C		C			C	
Approach Delay (s)		48.7			39.3			22.4			22.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	137	584	67	43	453	19	0	403	71	0	551	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.96		1.00	0.94
Flpb, ped/bikes	1.00	1.00		0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1588	3127		1598	3221			1389	1380		1550	1395
Flt Permitted	0.39	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	657	3127		448	3221			1389	1380		1550	1395
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	151	642	74	47	498	21	0	443	78	0	605	112
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	151	716	0	47	519	0	0	443	78	0	605	112
Confl. Peds. (#/hr)	2		103	103		2			37			61
Heavy Vehicles (%)	4%	3%	1%	0%	2%	0%	0%	4%	3%	1%	1%	0%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	23.5	23.5		23.5	23.5			33.5	33.5		33.5	33.5
Effective Green, g (s)	23.5	23.5		23.5	23.5			33.5	33.5		33.5	33.5
Actuated g/C Ratio	0.36	0.36		0.36	0.36			0.52	0.52		0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	237	1130		161	1164			715	711		798	718
v/s Ratio Prot		0.23			0.16			0.32			c0.39	
v/s Ratio Perm	c0.23			0.10					0.06			0.08
v/c Ratio	0.64	0.63		0.29	0.45			0.62	0.11		0.76	0.16
Uniform Delay, d1	17.2	17.2		14.8	15.8			11.2	8.1		12.5	8.3
Progression Factor	1.00	1.00		1.00	1.00			0.80	0.62		1.00	1.00
Incremental Delay, d2	5.5	1.2		1.0	0.3			3.1	0.2		6.7	0.5
Delay (s)	22.7	18.4		15.8	16.1			12.0	5.3		19.2	8.8
Level of Service	C	B		B	B			B	A		B	A
Approach Delay (s)		19.1			16.0			11.0			17.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1062: Ashland Ave. □ W Erie St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	43	56	26	12	17	19	0	517	9	0	579	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.97			0.95			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1539			1471			1379			1427	
Flt Permitted		0.89			0.93			1.00			1.00	
Satd. Flow (perm)		1394			1382			1379			1427	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	47	62	29	13	19	21	0	568	10	0	636	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	138	0	0	53	0	0	578	0	0	644	0
Confl. Peds. (#/hr)	15		12	12		15			10			3
Heavy Vehicles (%)	2%	4%	0%	0%	0%	11%	0%	7%	0%	2%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			39.0			39.0	
Effective Green, g (s)		18.0			18.0			39.0			39.0	
Actuated g/C Ratio		0.28			0.28			0.60			0.60	
Clearance Time (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		386			382			827			856	
v/s Ratio Prot								0.42			c0.45	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.36			0.14			0.70			0.75	
Uniform Delay, d1		18.9			17.7			9.0			9.5	
Progression Factor		1.00			1.00			0.74			0.79	
Incremental Delay, d2		2.6			0.8			3.4			5.2	
Delay (s)		21.4			18.4			10.1			12.7	
Level of Service		C			B			B			B	
Approach Delay (s)		21.4			18.4			10.1			12.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1066: Ashland Ave. □ W Grand Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	98	837	179	64	423	35	0	488	69	0	475	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.97		1.00	0.91
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1510	2876		1457	2915			1325	1337		1535	1179
Flt Permitted	0.40	1.00		0.18	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	643	2876		281	2915			1325	1337		1535	1179
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	108	920	197	70	465	38	0	536	76	0	522	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	108	1117	0	70	503	0	0	536	76	0	522	52
Confl. Peds. (#/hr)	41		61	61		41			16			58
Heavy Vehicles (%)	5%	6%	5%	8%	8%	6%	10%	9%	7%	3%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	30.6	29.6		21.8	21.8			27.4	27.4		27.4	27.4
Effective Green, g (s)	30.6	29.6		21.8	21.8			27.4	27.4		27.4	27.4
Actuated g/C Ratio	0.47	0.46		0.34	0.34			0.42	0.42		0.42	0.42
Clearance Time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	366	1309		94	977			558	563		647	496
v/s Ratio Prot	0.02	c0.39			0.17			c0.40			0.34	
v/s Ratio Perm	0.12			0.25					0.06			0.04
v/c Ratio	0.30	0.85		0.74	0.51			0.96	0.13		0.81	0.10
Uniform Delay, d1	12.9	15.8		19.1	17.4			18.3	11.5		16.5	11.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.82	0.57
Incremental Delay, d2	0.5	7.2		41.1	1.9			29.5	0.5		7.7	0.3
Delay (s)	13.3	23.0		60.3	19.3			47.8	12.0		21.1	6.8
Level of Service	B	C		E	B			D	B		C	A
Approach Delay (s)		22.1			24.3			43.3			19.8	
Approach LOS		C			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. □ W Fulton St. (West)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↳	
Volume (vph)	48	29	0	466	498	77
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.95			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.95			1.00	0.98	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1231			1450	1468	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1231			1450	1468	
Peak-hour factor, PHF	0.91	0.91	0.97	0.91	0.91	0.91
Adj. Flow (vph)	53	32	0	512	547	85
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	85	0	0	512	632	0
Confl. Peds. (#/hr)	23	12				
Heavy Vehicles (%)	29%	14%	21%	8%	5%	3%
Parking (#/hr)				0	0	
Turn Type	NA			NA	NA	
Protected Phases	4			2 10	6	
Permitted Phases						
Actuated Green, G (s)	16.0			78.0	70.0	
Effective Green, g (s)	16.0			78.0	70.0	
Actuated g/C Ratio	0.16			0.78	0.70	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	196			1131	1027	
v/s Ratio Prot	c0.07			c0.35	c0.43	
v/s Ratio Perm						
v/c Ratio	0.43			0.45	0.62	
Uniform Delay, d1	37.9			3.7	7.9	
Progression Factor	1.00			0.09	1.00	
Incremental Delay, d2	6.8			1.1	2.8	
Delay (s)	44.8			1.4	10.7	
Level of Service	D			A	B	
Approach Delay (s)	44.8			1.4	10.7	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1074: Ashland Ave. □ W Fulton St. (East)

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↑
Volume (vph)	10	15	466	67	0	510
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	11	11	11	11
Total Lost time (s)	3.0		3.0			3.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.85		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		0.98			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1043		1429			1425
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	1043		1429			1425
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.99	0.91
Adj. Flow (vph)	11	16	512	74	0	560
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	27	0	586	0	0	560
Confl. Peds. (#/hr)	12	23				
Heavy Vehicles (%)	30%	20%	8%	6%	0%	5%
Parking (#/hr)			0			8
Turn Type	NA		NA			NA
Protected Phases	8		2			6 14
Permitted Phases						
Actuated Green, G (s)	16.0		70.0			78.0
Effective Green, g (s)	16.0		70.0			78.0
Actuated g/C Ratio	0.16		0.70			0.78
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	166		1000			1111
v/s Ratio Prot	c0.03		c0.41			c0.39
v/s Ratio Perm						
v/c Ratio	0.16		0.59			0.50
Uniform Delay, d1	36.2		7.6			4.0
Progression Factor	1.00		0.68			0.16
Incremental Delay, d2	2.1		1.5			1.3
Delay (s)	38.3		6.7			1.9
Level of Service	D		A			A
Approach Delay (s)	38.3		6.7			1.9
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1077: Ashland Ave. □ W Lake St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↑	↱
Volume (vph)	37	280	37	6	158	42	0	490	33	0	513	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			0.99			1.00	0.69
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.99			1.00	0.85
Flt Protected		0.99			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1625			1602			1131			1689	915
Flt Permitted		0.95			0.99			1.00			1.00	1.00
Satd. Flow (perm)		1553			1584			1131			1689	915
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.93	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	41	308	41	7	174	46	0	538	36	0	564	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	390	0	0	227	0	0	574	0	0	564	16
Confl. Peds. (#/hr)	10		36	36		10			34			77
Confl. Bikes (#/hr)			3						2			6
Heavy Vehicles (%)	14%	7%	3%	67%	6%	7%	0%	9%	6%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA			NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8								6
Actuated Green, G (s)		30.0			30.0			62.0			62.0	62.0
Effective Green, g (s)		30.0			30.0			62.0			62.0	62.0
Actuated g/C Ratio		0.30			0.30			0.62			0.62	0.62
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		465			475			701			1047	567
v/s Ratio Prot								c0.51			0.33	
v/s Ratio Perm		c0.25			0.14							0.02
v/c Ratio		0.84			0.48			0.82			0.54	0.03
Uniform Delay, d1		32.7			28.6			14.7			10.8	7.3
Progression Factor		1.00			1.00			0.46			0.47	0.62
Incremental Delay, d2		16.4			3.4			9.8			1.8	0.1
Delay (s)		49.2			32.0			16.5			6.9	4.7
Level of Service		D			C			B			A	A
Approach Delay (s)		49.2			32.0			16.5			6.9	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations				↰	↑↑	↱		↑↑			↑↱	
Volume (vph)	0	0	0	8	139	10	0	640	0	0	558	106
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00		0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.96		1.00			0.98	
Flpb, ped/bikes				0.99	1.00	1.00		1.00			1.00	
Frt				1.00	1.00	0.85		1.00			0.98	
Flt Protected				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)				1588	3192	1242		2935			2704	
Flt Permitted				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (perm)				1588	3192	1242		2935			2704	
Peak-hour factor, PHF	0.91	0.97	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	0	0	0	9	153	11	0	703	0	0	613	116
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	9	153	11	0	703	0	0	729	0
Confl. Peds. (#/hr)			4	4		23			27			56
Confl. Bikes (#/hr)			1			2						3
Heavy Vehicles (%)	9%	0%	0%	0%	0%	10%	3%	7%	0%	0%	4%	2%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				27.0	27.0	27.0		65.0			65.0	
Effective Green, g (s)				27.0	27.0	27.0		65.0			65.0	
Actuated g/C Ratio				0.27	0.27	0.27		0.65			0.65	
Clearance Time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)				428	861	335		1907			1757	
v/s Ratio Prot					c0.05			0.24			c0.27	
v/s Ratio Perm				0.01		0.01						
v/c Ratio				0.02	0.18	0.03		0.37			0.41	
Uniform Delay, d1				26.8	28.0	26.9		8.1			8.4	
Progression Factor				1.00	1.00	1.00		0.44			0.70	
Incremental Delay, d2				0.1	0.5	0.2		0.5			0.7	
Delay (s)				26.9	28.4	27.1		4.1			6.5	
Level of Service				C	C	C		A			A	
Approach Delay (s)		0.0			28.3			4.1			6.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1080: Ashland Ave. □ W Warren Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↱						↑↱			↑↑	
Volume (vph)	108	278	42	0	0	0	0	530	65	0	464	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						0.95			0.95	
Frpb, ped/bikes		1.00						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.98			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		2873						2591			2589	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		2873						2591			2589	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	119	305	46	0	0	0	0	582	71	0	510	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	470	0	0	0	0	0	653	0	0	510	0
Confl. Peds. (#/hr)	3		5			3			29			32
Confl. Bikes (#/hr)			4						2			2
Heavy Vehicles (%)	7%	3%	2%	0%	0%	0%	0%	7%	3%	3%	4%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		37.0						55.0			55.0	
Effective Green, g (s)		37.0						55.0			55.0	
Actuated g/C Ratio		0.37						0.55			0.55	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1063						1425			1423	
v/s Ratio Prot								c0.25			0.20	
v/s Ratio Perm		0.16										
v/c Ratio		0.44						0.46			0.36	
Uniform Delay, d1		23.7						13.5			12.6	
Progression Factor		1.00						0.71			0.51	
Incremental Delay, d2		1.3						1.0			0.7	
Delay (s)		25.1						10.6			7.1	
Level of Service		C						B			A	
Approach Delay (s)		25.1			0.0			10.6			7.1	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	48	324	39	20	218	73	0	407	3	0	556	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.96			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1513	2864		1569	2800			2906			3023	
Flt Permitted	0.53	1.00		0.46	1.00			1.00			1.00	
Satd. Flow (perm)	838	2864		762	2800			2906			3023	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	53	356	43	22	240	80	0	447	3	0	611	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	53	399	0	22	320	0	0	450	0	0	635	0
Confl. Peds. (#/hr)	16		23	23		16			17			25
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	4%	9%	10%	0%	10%	5%	17%	8%	0%	5%	3%	5%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8								
Actuated Green, G (s)	33.0	33.0		45.0	43.0			49.0			49.0	
Effective Green, g (s)	33.0	33.0		45.0	43.0			49.0			49.0	
Actuated g/C Ratio	0.33	0.33		0.45	0.43			0.49			0.49	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	276	945		342	1204			1423			1481	
v/s Ratio Prot		c0.14			c0.11			0.15			c0.21	
v/s Ratio Perm	0.06			0.03								
v/c Ratio	0.19	0.42		0.06	0.27			0.32			0.43	
Uniform Delay, d1	24.0	26.1		15.6	18.3			15.4			16.5	
Progression Factor	1.00	1.00		1.00	1.00			0.50			0.43	
Incremental Delay, d2	1.5	1.4		0.4	0.5			0.4			0.9	
Delay (s)	25.5	27.5		15.9	18.9			8.1			8.0	
Level of Service	C	C		B	B			A			A	
Approach Delay (s)		27.2			18.7			8.1			8.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1083: Ashland Ave. W Ogden Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	160	558	0	250	568	1	0	320	185	0	405	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1628	3288		1588	3143			2835			2897	
Flt Permitted	0.38	1.00		0.36	1.00			1.00			1.00	
Satd. Flow (perm)	646	3288		598	3143			2835			2897	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	176	613	0	275	624	1	0	352	203	0	445	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	176	613	0	275	625	0	0	555	0	0	570	0
Confl. Peds. (#/hr)	1		5	5		1			15			20
Confl. Bikes (#/hr)			3									2
Heavy Vehicles (%)	5%	4%	0%	4%	5%	100%	0%	9%	9%	0%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	3	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	47.0	47.0		64.0	63.0			29.0			29.0	
Effective Green, g (s)	47.0	47.0		64.0	63.0			29.0			29.0	
Actuated g/C Ratio	0.47	0.47		0.64	0.63			0.29			0.29	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	303	1545		511	1980			822			840	
v/s Ratio Prot		0.19		c0.07	0.20			0.20			c0.20	
v/s Ratio Perm	c0.27			0.27								
v/c Ratio	0.58	0.40		0.54	0.32			0.68			0.68	
Uniform Delay, d1	19.3	17.3		15.6	8.5			31.3			31.4	
Progression Factor	1.00	1.00		1.00	1.00			0.56			0.97	
Incremental Delay, d2	7.9	0.8		4.0	0.4			4.1			4.1	
Delay (s)	27.2	18.0		19.6	9.0			21.8			34.6	
Level of Service	C	B		B	A			C			C	
Approach Delay (s)		20.1			12.2			21.8			34.6	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1084: Ashland Ave. □ W Monroe St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑↱			↑↱	
Volume (vph)	0	72	31	46	20	21	0	636	50	0	497	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.97			0.99			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1561			1439			2672			3019	
Flt Permitted		1.00			0.82			1.00			1.00	
Satd. Flow (perm)		1561			1210			2672			3019	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	79	34	51	22	23	0	699	55	0	546	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	113	0	0	96	0	0	754	0	0	547	0
Confl. Peds. (#/hr)	5		15	15		5			39			16
Confl. Bikes (#/hr)			2			1			1			
Heavy Vehicles (%)	0%	3%	0%	9%	10%	5%	0%	8%	2%	1%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.0			28.0			64.0			64.0	
Effective Green, g (s)		28.0			28.0			64.0			64.0	
Actuated g/C Ratio		0.28			0.28			0.64			0.64	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		437			338			1710			1932	
v/s Ratio Prot		0.07						c0.28			0.18	
v/s Ratio Perm					c0.08							
v/c Ratio		0.26			0.28			0.44			0.28	
Uniform Delay, d1		27.9			28.2			9.0			7.9	
Progression Factor		1.00			1.00			0.41			0.48	
Incremental Delay, d2		1.4			2.1			0.7			0.3	
Delay (s)		29.4			30.3			4.5			4.1	
Level of Service		C			C			A			A	
Approach Delay (s)		29.4			30.3			4.5			4.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1085: Ashland Ave. □ W Adams St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑↑↱			↑↑↱	
Volume (vph)	0	0	0	202	140	145	0	538	0	0	493	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.96			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					2717			2495			2858	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					2717			2495			2858	
Peak-hour factor, PHF	0.91	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	222	154	159	0	591	0	0	542	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	535	0	0	591	0	0	578	0
Confl. Peds. (#/hr)			53	53		32			25			45
Confl. Bikes (#/hr)			1			1			2			3
Heavy Vehicles (%)	6%	0%	0%	5%	6%	3%	0%	8%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								54			12	12
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					42.0			50.0			50.0	
Effective Green, g (s)					42.0			50.0			50.0	
Actuated g/C Ratio					0.42			0.50			0.50	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1141			1247			1429	
v/s Ratio Prot								c0.24			0.20	
v/s Ratio Perm					0.20							
v/c Ratio					0.47			0.47			0.40	
Uniform Delay, d1					20.9			16.4			15.7	
Progression Factor					1.00			0.12			0.50	
Incremental Delay, d2					1.4			1.2			0.8	
Delay (s)					22.3			3.2			8.6	
Level of Service					C			A			A	
Approach Delay (s)		0.0			22.3			3.2			8.6	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1086: Ashland Ave. □ W Jackson Blvd.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱			↑↑	
Volume (vph)	34	166	88	0	0	0	0	498	52	0	496	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0			4.0	
Lane Util. Factor		0.95	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.97					1.00			1.00	
Flpb, ped/bikes		1.00	1.00					1.00			1.00	
Frt		1.00	0.85					0.99			1.00	
Flt Protected		0.99	1.00					1.00			1.00	
Satd. Flow (prot)		3217	1455					2966			2781	
Flt Permitted		0.99	1.00					1.00			1.00	
Satd. Flow (perm)		3217	1455					2966			2781	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.88	0.91	0.92	0.91	0.91	0.88	0.91	0.91
Adj. Flow (vph)	37	182	97	0	0	0	0	547	57	0	545	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	219	97	0	0	0	0	604	0	0	545	0
Confl. Peds. (#/hr)	12		16			12			9			17
Heavy Vehicles (%)	6%	5%	2%	2%	0%	0%	2%	10%	6%	4%	7%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4		4									
Actuated Green, G (s)		36.0	36.0					55.0			55.0	
Effective Green, g (s)		36.0	36.0					55.0			55.0	
Actuated g/C Ratio		0.36	0.36					0.55			0.55	
Clearance Time (s)		5.0	5.0					4.0			4.0	
Lane Grp Cap (vph)		1158	523					1631			1529	
v/s Ratio Prot								c0.20			0.20	
v/s Ratio Perm		0.07	0.07									
v/c Ratio		0.19	0.19					0.37			0.36	
Uniform Delay, d1		22.0	21.9					12.7			12.6	
Progression Factor		1.00	1.00					0.61			0.85	
Incremental Delay, d2		0.4	0.8					0.6			0.6	
Delay (s)		22.3	22.7					8.3			11.3	
Level of Service		C	C					A			B	
Approach Delay (s)		22.5			0.0			8.3			11.3	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1088: Ashland Ave. □ W Van Buren St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↰↑	↱	↰	↑↑			↑↱	
Volume (vph)	0	0	0	748	288	193	405	502	0	0	645	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				0.91	0.91	1.00	1.00	0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.96	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1489	2998	1353	1589	2855			2891	
Flt Permitted				0.95	0.97	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1489	2998	1353	1589	2855			2891	
Peak-hour factor, PHF	0.91	0.99	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	0	0	0	822	316	212	445	552	0	0	709	137
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	411	727	212	445	552	0	0	846	0
Confl. Peds. (#/hr)			2	2		19	13		9			13
Confl. Bikes (#/hr)						1			2			2
Heavy Vehicles (%)	7%	0%	0%	1%	5%	5%	4%	10%	0%	0%	5%	6%
Parking (#/hr)								0			0	
Turn Type				Split	NA	Perm	Prot	NA			NA	
Protected Phases				8	8		5	5 6			6 16	
Permitted Phases						8						
Actuated Green, G (s)				26.0	26.0	26.0	34.0	48.0			28.0	
Effective Green, g (s)				26.0	26.0	26.0	34.0	48.0			26.0	
Actuated g/C Ratio				0.26	0.26	0.26	0.34	0.48			0.26	
Clearance Time (s)				4.0	4.0	4.0	4.0					
Lane Grp Cap (vph)				387	779	351	540	1370			751	
v/s Ratio Prot				c0.28	0.24		c0.28	0.19			c0.29	
v/s Ratio Perm						0.16						
v/c Ratio				1.06	1.02dl	0.60	0.82	0.40			1.13	
Uniform Delay, d1				37.0	36.2	32.5	30.3	16.8			37.0	
Progression Factor				1.00	1.00	1.00	0.47	0.48			0.80	
Incremental Delay, d2				63.1	19.6	7.5	6.0	0.4			73.2	
Delay (s)				100.1	55.7	40.0	20.2	8.3			102.9	
Level of Service				F	E	D	C	A			F	
Approach Delay (s)		0.0			66.8			13.6			102.9	
Approach LOS		A			E			B			F	

Intersection Summary			
HCM 2000 Control Delay	59.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1089: Ashland Ave. □ W Congress Pkwy

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱		↰	↑↑	
Volume (vph)	150	172	221	0	0	0	0	808	253	259	880	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0					2.0		4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.96		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3155	1471					2810		1589	3031	
Flt Permitted		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		3155	1471					2810		1589	3031	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	189	243	0	0	0	0	888	278	285	967	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	354	243	0	0	0	0	1166	0	285	967	0
Confl. Peds. (#/hr)			6						3	3		2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	7%	5%	2%	1%	0%	0%	0%	8%	2%	4%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2 12		1	1 2	
Permitted Phases			4									
Actuated Green, G (s)		26.0	26.0					42.0		22.0	42.0	
Effective Green, g (s)		26.0	26.0					42.0		22.0	42.0	
Actuated g/C Ratio		0.26	0.26					0.42		0.22	0.42	
Clearance Time (s)		4.0	4.0							4.0		
Lane Grp Cap (vph)		820	382					1180		349	1273	
v/s Ratio Prot		0.11						c0.41		c0.18	0.32	
v/s Ratio Perm			c0.17									
v/c Ratio		0.43	0.64					0.99		0.82	0.76	
Uniform Delay, d1		30.8	32.8					28.8		37.1	24.7	
Progression Factor		1.00	1.00					0.89		1.06	0.89	
Incremental Delay, d2		1.7	7.9					20.6		2.0	0.4	
Delay (s)		32.5	40.7					46.1		41.3	22.4	
Level of Service		C	D					D		D	C	
Approach Delay (s)		35.8			0.0			46.1			26.7	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	174	124	52	100	202	81	0	959	37	0	904	247
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.98			1.00			0.99	
Flpb, ped/bikes	0.99	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.96			0.99			0.97	
Flt Protected	0.95	0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1493	2925		1512	2865			2868			2901	
Flt Permitted	0.43	0.75		0.58	1.00			1.00			1.00	
Satd. Flow (perm)	679	2221		927	2865			2868			2901	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	191	136	57	110	222	89	0	1054	41	0	993	271
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	120	264	0	110	311	0	0	1095	0	0	1264	0
Confl. Peds. (#/hr)	31		71	71		31			41			22
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	2%	0%	0%	7%	0%	0%	8%	8%	3%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA			NA			NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.0	33.0		22.0	22.0			57.0			57.0	
Effective Green, g (s)	33.0	33.0		22.0	22.0			57.0			57.0	
Actuated g/C Ratio	0.33	0.33		0.22	0.22			0.57			0.57	
Clearance Time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	289	789		203	630			1634			1653	
v/s Ratio Prot	c0.03	0.03			0.11			0.38			c0.44	
v/s Ratio Perm	0.10	0.08		c0.12								
v/c Ratio	0.42	0.33		0.54	0.49			0.67			0.76	
Uniform Delay, d1	24.6	25.2		34.5	34.1			15.0			16.4	
Progression Factor	1.00	1.00		1.00	1.00			0.55			0.83	
Incremental Delay, d2	4.4	1.1		10.0	2.8			1.9			2.3	
Delay (s)	29.0	26.4		44.5	36.9			10.2			15.9	
Level of Service	C	C		D	D			B			B	
Approach Delay (s)		27.2			38.9			10.2			15.9	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1091: Ashland Ave. □ W Flourney St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✥			↑↱			↑↱	
Volume (vph)	108	0	14	2	0	11	0	956	3	0	637	299
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.99		0.98			1.00			0.98	
Flpb, ped/bikes	0.98		1.00		1.00			1.00			1.00	
Frt	1.00		0.85		0.88			1.00			0.95	
Flt Protected	0.95		1.00		0.99			1.00			1.00	
Satd. Flow (prot)	3044		1409		1550			2934			2874	
Flt Permitted	0.75		1.00		0.99			1.00			1.00	
Satd. Flow (perm)	2398		1409		1550			2934			2874	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	119	0	15	2	0	12	0	1051	3	0	700	329
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	119	0	15	0	14	0	0	1054	0	0	1029	0
Confl. Peds. (#/hr)	9		1	1		9			21			14
Confl. Bikes (#/hr)									4			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	28.0		28.0		28.0			63.0			63.0	
Effective Green, g (s)	28.0		28.0		28.0			63.0			63.0	
Actuated g/C Ratio	0.28		0.28		0.28			0.63			0.63	
Clearance Time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Grp Cap (vph)	671		394		434			1848			1810	
v/s Ratio Prot								c0.36			0.36	
v/s Ratio Perm	c0.05		0.01		0.01							
v/c Ratio	0.18		0.04		0.03			0.57			0.57	
Uniform Delay, d1	27.3		26.2		26.2			10.7			10.7	
Progression Factor	1.00		1.00		1.00			1.12			0.28	
Incremental Delay, d2	0.6		0.2		0.1			1.1			0.9	
Delay (s)	27.9		26.4		26.3			13.1			3.8	
Level of Service	C		C		C			B			A	
Approach Delay (s)		27.7			26.3			13.1			3.8	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑↱			↑↱	
Volume (vph)	86	16	37	6	28	70	0	902	10	0	563	147
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.95			0.93			1.00			0.98	
Flpb, ped/bikes		0.96			0.99			1.00			1.00	
Frt		0.96			0.91			1.00			0.97	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1429			1411			2876			2821	
Flt Permitted		0.78			0.99			1.00			1.00	
Satd. Flow (perm)		1149			1395			2876			2821	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	95	18	41	7	31	77	0	991	11	0	619	162
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	154	0	0	115	0	0	1002	0	0	781	0
Confl. Peds. (#/hr)	60		129	129		60			39			14
Confl. Bikes (#/hr)			4			6			5			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	8%	20%	0%	6%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.0			30.0			62.0			62.0	
Effective Green, g (s)		30.0			30.0			62.0			62.0	
Actuated g/C Ratio		0.30			0.30			0.62			0.62	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		344			418			1783			1749	
v/s Ratio Prot								c0.35			0.28	
v/s Ratio Perm		c0.13			0.08							
v/c Ratio		0.45			0.28			0.56			0.45	
Uniform Delay, d1		28.3			26.7			11.1			10.0	
Progression Factor		1.00			1.00			1.11			0.26	
Incremental Delay, d2		4.2			1.6			1.2			0.7	
Delay (s)		32.5			28.3			13.5			3.3	
Level of Service		C			C			B			A	
Approach Delay (s)		32.5			28.3			13.5			3.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	36	123	37	44	254	68	0	656	95	0	312	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.85		0.98			0.97	
Flpb, ped/bikes	0.92	1.00	1.00	0.98	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.98			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1472	1570	1369	1559	1600	1188		2747			2675	
Flt Permitted	0.46	1.00	1.00	0.65	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	716	1570	1369	1064	1600	1188		2747			2675	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	40	135	41	48	279	75	0	721	104	0	343	211
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	40	135	41	48	279	75	0	825	0	0	554	0
Confl. Peds. (#/hr)	98		20	20		98			23			15
Confl. Bikes (#/hr)			2			5			1			3
Heavy Vehicles (%)	0%	7%	0%	0%	5%	2%	0%	10%	8%	6%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	36.0	36.0	36.0	36.0	36.0	36.0		55.0			55.0	
Effective Green, g (s)	36.0	36.0	36.0	36.0	36.0	36.0		55.0			55.0	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36		0.55			0.55	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Grp Cap (vph)	257	565	492	383	576	427		1510			1471	
v/s Ratio Prot		0.09			c0.17			c0.30			0.21	
v/s Ratio Perm	0.06		0.03	0.05		0.06						
v/c Ratio	0.16	0.24	0.08	0.13	0.48	0.18		0.55			0.38	
Uniform Delay, d1	21.7	22.4	21.1	21.4	24.8	21.9		14.5			12.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.72			0.29	
Incremental Delay, d2	1.3	1.0	0.3	0.7	2.9	0.9		0.6			0.7	
Delay (s)	23.0	23.4	21.4	22.1	27.7	22.8		11.1			4.4	
Level of Service	C	C	C	C	C	C		B			A	
Approach Delay (s)		23.0			26.1			11.1			4.4	
Approach LOS		C			C			B			A	

Intersection Summary				
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	54.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1094: Ashland Ave. □ W Roosevelt Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	131	862	108	126	1016	259	0	619	115	0	334	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.96		1.00	0.93		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1564	3069	1286	1505	3099	1337		1491	1214		1657	1249
Flt Permitted	0.11	1.00	1.00	0.13	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	188	3069	1286	207	3099	1337		1491	1214		1657	1249
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	144	947	119	138	1116	285	0	680	126	0	367	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	144	947	119	138	1116	285	0	680	126	0	367	91
Confl. Peds. (#/hr)	28		24	24		28			52			29
Confl. Bikes (#/hr)						4			3			1
Heavy Vehicles (%)	2%	4%	4%	6%	3%	2%	5%	5%	1%	3%	5%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	42.0	35.0	35.0	42.0	35.0	35.0		45.0	45.0		45.0	45.0
Effective Green, g (s)	42.0	35.0	35.0	42.0	35.0	35.0		45.0	45.0		45.0	45.0
Actuated g/C Ratio	0.42	0.35	0.35	0.42	0.35	0.35		0.45	0.45		0.45	0.45
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	5.0	3.0	3.0	5.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	175	1074	450	177	1084	467		670	546		745	562
v/s Ratio Prot	c0.06	0.31		0.05	c0.36			c0.46			0.22	
v/s Ratio Perm	0.29		0.09	0.27		0.21			0.10			0.07
v/c Ratio	0.82	0.88	0.26	0.78	1.03	0.61		1.01	0.23		0.49	0.16
Uniform Delay, d1	22.8	30.6	23.3	21.3	32.5	26.9		27.5	16.9		19.4	16.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.72	0.58		0.88	0.96
Incremental Delay, d2	28.3	10.4	1.4	22.1	35.2	5.8		34.7	0.8		2.2	0.6
Delay (s)	51.2	41.0	24.7	43.4	67.7	32.7		54.6	10.6		19.4	16.3
Level of Service	D	D	C	D	E	C		D	B		B	B
Approach Delay (s)		40.6			59.0			47.7			18.8	
Approach LOS		D			E			D			B	

Intersection Summary			
HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1096: Ashland Ave. □ W 13th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	50	0	35	2	0	1	0	703	2	0	342	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.94			0.95			1.00			0.99	
Flt Protected		0.97			0.97			1.00			1.00	
Satd. Flow (prot)		1507			1624			1448			1464	
Flt Permitted		0.82			0.88			1.00			1.00	
Satd. Flow (perm)		1267			1470			1448			1464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	55	0	38	2	0	1	0	773	2	0	376	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	0	0	3	0	0	775	0	0	401	0
Confl. Peds. (#/hr)	2		7	7		2			8			10
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	6%	0%	8%	0%	6%	0%	4%	8%	50%	0%	6%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		11.3			11.3			80.7			80.7	
Effective Green, g (s)		11.3			11.3			80.7			80.7	
Actuated g/C Ratio		0.11			0.11			0.81			0.81	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		143			166			1168			1181	
v/s Ratio Prot								c0.54			0.27	
v/s Ratio Perm		c0.07			0.00							
v/c Ratio		0.65			0.02			0.66			0.34	
Uniform Delay, d1		42.5			39.4			4.0			2.6	
Progression Factor		1.00			1.00			0.00			0.66	
Incremental Delay, d2		13.4			0.1			1.3			0.7	
Delay (s)		55.8			39.5			1.3			2.4	
Level of Service		E			D			A			A	
Approach Delay (s)		55.8			39.5			1.3			2.4	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	⤴	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	0	0	20	11	0	3	0	758	0	0	298	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.90			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.94			1.00			1.00	
Frt		0.86			0.97			1.00			1.00	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1406			1586			1297			1446	
Flt Permitted		1.00			0.86			1.00			1.00	
Satd. Flow (perm)		1406			1426			1297			1446	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	0	0	22	12	0	3	0	833	0	0	327	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	22	0	0	15	0	0	833	0	0	334	0
Confl. Peds. (#/hr)			30	30					6			9
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	7%	0%	0%	0%	0%	0%	2%	10%	0%	4%	8%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			72.0			72.0	
Effective Green, g (s)		20.0			20.0			72.0			72.0	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		281			285			933			1041	
v/s Ratio Prot		c0.02						c0.64			0.23	
v/s Ratio Perm					0.01							
v/c Ratio		0.08			0.05			0.89			0.32	
Uniform Delay, d1		32.5			32.3			11.0			5.1	
Progression Factor		1.00			1.00			1.00			0.78	
Incremental Delay, d2		0.5			0.4			12.7			0.8	
Delay (s)		33.1			32.7			23.7			4.7	
Level of Service		C			C			C			A	
Approach Delay (s)		33.1			32.7			23.7			4.7	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1103: Ashland Ave. □ W 18th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	67	257	93	68	358	148	0	759	88	0	294	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.74		1.00	0.84		1.00	0.86
Flpb, ped/bikes	0.91	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1393	1600	1245	1501	1585	1039		1289	1115		1254	1065
Flt Permitted	0.19	1.00	1.00	0.37	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	280	1600	1245	586	1585	1039		1289	1115		1254	1065
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	74	282	102	75	393	163	0	834	97	0	323	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	74	282	102	75	393	163	0	834	97	0	323	63
Confl. Peds. (#/hr)	117		28	28		117			43			39
Confl. Bikes (#/hr)			6			3						1
Heavy Vehicles (%)	4%	5%	5%	3%	6%	2%	1%	8%	12%	6%	11%	19%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	23.0	23.0	23.0	23.0	23.0	23.0		56.0	56.0		56.0	56.0
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0		56.0	56.0		56.0	56.0
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26		0.62	0.62		0.62	0.62
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	71	408	318	149	405	265		802	693		780	662
v/s Ratio Prot		0.18			0.25			c0.65			0.26	
v/s Ratio Perm	c0.26		0.08	0.13		0.16			0.09			0.06
v/c Ratio	1.04	0.69	0.32	0.50	0.97	0.62		1.04	0.14		0.41	0.10
Uniform Delay, d1	33.5	30.3	27.2	28.6	33.2	29.6		17.0	7.0		8.7	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.63	0.57		1.00	1.00
Incremental Delay, d2	119.0	9.3	2.6	11.6	37.9	10.2		30.7	0.2		1.6	0.3
Delay (s)	152.5	39.5	29.8	40.3	71.1	39.8		41.5	4.1		10.3	7.1
Level of Service	F	D	C	D	E	D		D	A		B	A
Approach Delay (s)		55.6			59.3			37.6			9.8	
Approach LOS		E			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1105: Ashland Ave. □ W 19th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	58	44	18	43	77	75	0	824	7	0	519	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.93			1.00			0.99	
Flpb, ped/bikes		0.95			0.97			1.00			1.00	
Frt		0.98			0.95			1.00			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1556			1487			1333			1234	
Flt Permitted		0.68			0.92			1.00			1.00	
Satd. Flow (perm)		1085			1380			1333			1234	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	64	48	20	47	85	82	0	905	8	0	570	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	132	0	0	214	0	0	913	0	0	610	0
Confl. Peds. (#/hr)	73		75	75		73			59			40
Confl. Bikes (#/hr)			1			1			1			2
Heavy Vehicles (%)	5%	0%	0%	0%	0%	6%	6%	8%	0%	0%	8%	3%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		19.0			19.0			63.0			63.0	
Effective Green, g (s)		19.0			19.0			63.0			63.0	
Actuated g/C Ratio		0.21			0.21			0.70			0.70	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		229			291			933			863	
v/s Ratio Prot								c0.68			0.49	
v/s Ratio Perm		0.12			c0.16							
v/c Ratio		0.58			0.74			0.98			0.71	
Uniform Delay, d1		31.9			33.2			12.9			8.0	
Progression Factor		1.00			1.00			0.81			0.64	
Incremental Delay, d2		10.2			15.2			18.9			4.7	
Delay (s)		42.0			48.4			29.3			9.8	
Level of Service		D			D			C			A	
Approach Delay (s)		42.0			48.4			29.3			9.8	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1107: Ashland Ave. □ W 21st St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	45	176	9	97	132	33	0	669	32	0	535	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		0.99			0.97			1.00			1.00	
Frt		0.99			0.98			0.99			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1702			1582			1287			1317	
Flt Permitted		0.88			0.69			1.00			1.00	
Satd. Flow (perm)		1503			1106			1287			1317	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	49	193	10	107	145	36	0	735	35	0	588	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	252	0	0	288	0	0	770	0	0	612	0
Confl. Peds. (#/hr)	49		88	88		49			32			43
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	9%	1%	0%	4%	3%	13%	0%	7%	3%	2%	10%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			58.0			58.0	
Effective Green, g (s)		24.0			24.0			58.0			58.0	
Actuated g/C Ratio		0.27			0.27			0.64			0.64	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		400			294			829			848	
v/s Ratio Prot								c0.60			0.46	
v/s Ratio Perm		0.17			c0.26							
v/c Ratio		0.63			0.98			0.93			0.72	
Uniform Delay, d1		29.1			32.8			14.2			10.6	
Progression Factor		1.00			1.00			0.49			0.47	
Incremental Delay, d2		4.4			46.8			2.4			4.0	
Delay (s)		33.5			79.5			9.2			9.0	
Level of Service		C			E			A			A	
Approach Delay (s)		33.5			79.5			9.2			9.0	
Approach LOS		C			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↰	↑↱			↰	↑↱		↑	↱	↑	↲	
Volume (vph)	75	349	52	92	92	495	173	604	98	486	130	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	11	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95			1.00	0.95		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	0.92		1.00	0.99	1.00	0.89	
Flpb, ped/bikes	0.90	1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98			1.00	0.96		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00			0.95	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1296	3016			1347	2678		862	721	1402	962	
Flt Permitted	0.29	1.00			0.31	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (perm)	396	3016			433	2678		862	721	1402	962	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	384	57	101	101	544	190	664	108	534	143	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	82	441	0	0	202	734	0	664	108	534	172	0
Confl. Peds. (#/hr)	155						155				50	
Confl. Bikes (#/hr)							5		1		3	
Heavy Vehicles (%)	11%	8%	4%	15%	22%	8%	11%	7%	6%	8%	18%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	3	0
Parking (#/hr)								74	74	6	6	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		NA	Perm	NA	Perm	
Protected Phases		4		3	3	8		2		6		
Permitted Phases	4			8	8				2		6	
Actuated Green, G (s)	21.0	21.0			29.0	29.0		37.0	37.0	37.0	37.0	
Effective Green, g (s)	21.0	21.0			29.0	29.0		37.0	37.0	37.0	37.0	
Actuated g/C Ratio	0.23	0.23			0.32	0.32		0.41	0.41	0.41	0.41	
Clearance Time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	92	703			190	862		354	296	576	395	
v/s Ratio Prot		0.15			c0.06	0.27		c0.77		0.38		
v/s Ratio Perm	0.21				c0.28				0.15		0.18	
v/c Ratio	0.89	0.63			1.06	0.85		1.88	0.36	0.93	0.44	
Uniform Delay, d1	33.4	31.0			30.1	28.5		26.5	18.4	25.2	19.0	
Progression Factor	1.00	1.00			1.00	1.00		0.98	0.94	0.80	0.86	
Incremental Delay, d2	59.6	1.8			83.0	8.1		403.1	2.9	16.3	0.5	
Delay (s)	93.0	32.7			113.1	36.6		429.0	20.1	36.4	16.9	
Level of Service	F	C			F	D		F	C	D	B	
Approach Delay (s)		42.2				53.1		371.8		31.7		
Approach LOS		D				D		F		C		

Intersection Summary			
HCM 2000 Control Delay	145.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	NEL	NER	NER2
Lane Configurations			
Volume (vph)	208	204	37
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	11	12	12
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.85	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1401	1329	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1401	1329	
Peak-hour factor, PHF	0.91	0.91	0.91
Adj. Flow (vph)	229	224	41
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	229	265	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	18%	15%	16%
Bus Blockages (#/hr)	0	0	0
Parking (#/hr)			
Turn Type	NA	Perm	
Protected Phases	9		
Permitted Phases		9	
Actuated Green, G (s)	12.0	12.0	
Effective Green, g (s)	12.0	12.0	
Actuated g/C Ratio	0.13	0.13	
Clearance Time (s)	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	186	177	
v/s Ratio Prot	0.16		
v/s Ratio Perm		c0.20	
v/c Ratio	1.23	1.50	
Uniform Delay, d1	39.0	39.0	
Progression Factor	1.00	1.00	
Incremental Delay, d2	141.8	251.0	
Delay (s)	180.8	290.0	
Level of Service	F	F	
Approach Delay (s)	239.4		
Approach LOS	F		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1110: Ashland Ave. □ 2451 S Ashland Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	2	0	3	2	0	0	0	757	0	0	563	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			1.00			1.00			1.00	
Flpb, ped/bikes		0.99			0.94			1.00			1.00	
Frt		0.92			1.00			1.00			1.00	
Flt Protected		0.98			0.95			1.00			1.00	
Satd. Flow (prot)		1531			807			1596			1672	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1562			850			1596			1672	
Peak-hour factor, PHF	0.91	0.94	0.91	0.91	0.94	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	2	0	3	2	0	0	0	832	0	0	619	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	0	2	0	0	832	0	0	621	0
Confl. Peds. (#/hr)	1		2	2		1			2			1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	100%	0%	0%	14%	9%	0%	25%	4%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		1.6			1.6			78.4			78.4	
Effective Green, g (s)		1.6			1.6			78.4			78.4	
Actuated g/C Ratio		0.02			0.02			0.87			0.87	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		27			15			1390			1456	
v/s Ratio Prot								c0.52			0.37	
v/s Ratio Perm		c0.00			0.00							
v/c Ratio		0.19			0.13			0.60			0.43	
Uniform Delay, d1		43.6			43.5			1.6			1.2	
Progression Factor		1.00			1.00			1.00			0.50	
Incremental Delay, d2		6.8			8.3			1.9			0.3	
Delay (s)		50.4			51.8			3.5			0.9	
Level of Service		D			D			A			A	
Approach Delay (s)		50.4			51.8			3.5			0.9	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑	↱
Volume (vph)	0	1	0	775	645	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)		4.0		5.0	5.0	
Lane Util. Factor		1.00		1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		765		1642	1582	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		765		1642	1582	
Peak-hour factor, PHF	0.91	0.91	0.96	0.91	0.91	0.91
Adj. Flow (vph)	0	1	0	852	709	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	852	709	0
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	100%	50%	6%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	3
Turn Type		Perm		NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4				6
Actuated Green, G (s)		1.3		89.7	89.7	
Effective Green, g (s)		1.3		89.7	89.7	
Actuated g/C Ratio		0.01		0.90	0.90	
Clearance Time (s)		4.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0	
Lane Grp Cap (vph)		9		1472	1419	
v/s Ratio Prot				c0.52	0.45	
v/s Ratio Perm		c0.00				
v/c Ratio		0.11		0.58	0.50	
Uniform Delay, d1		48.8		1.1	1.0	
Progression Factor		1.00		0.56	1.00	
Incremental Delay, d2		5.4		1.0	1.3	
Delay (s)		54.2		1.6	2.2	
Level of Service		D		A	A	
Approach Delay (s)	54.2			1.6	2.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑↱	
Volume (vph)	32	17	0	745	574	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1096	1012		1171	1138	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1096	1012		1171	1138	
Peak-hour factor, PHF	0.91	0.91	0.92	0.91	0.91	0.91
Adj. Flow (vph)	35	19	0	819	631	20
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	35	19	0	819	651	0
Confl. Peds. (#/hr)		1				3
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	56%	47%	29%	4%	7%	39%
Parking (#/hr)				40	38	
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	6.3	6.3		84.7	84.7	
Effective Green, g (s)	6.3	6.3		84.7	84.7	
Actuated g/C Ratio	0.06	0.06		0.85	0.85	
Clearance Time (s)	4.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	69	63		991	963	
v/s Ratio Prot	c0.03			c0.70	0.57	
v/s Ratio Perm		0.02				
v/c Ratio	0.51	0.30		0.83	0.68	
Uniform Delay, d1	45.3	44.7		3.9	2.7	
Progression Factor	1.00	1.00		1.55	0.83	
Incremental Delay, d2	5.8	2.7		4.4	3.4	
Delay (s)	51.1	47.4		10.5	5.7	
Level of Service	D	D		B	A	
Approach Delay (s)	49.8			10.5	5.7	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1113: Ashland Ave. □ W 31st Pl.

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		✥			↱		↰	↑	↱
Volume (vph)	388	0	187	15	0	15	0	471	15	15	467	182
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Lane Util. Factor	1.00		1.00		1.00			1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00		1.00			1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00		1.00			1.00		0.99	1.00	1.00
Frt	1.00		0.85		0.93			1.00		1.00	1.00	0.85
Flt Protected	0.95		1.00		0.98			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1605		1222		819			1602		820	1611	1352
Flt Permitted	0.95		1.00		0.98			1.00		0.32	1.00	1.00
Satd. Flow (perm)	1605		1222		819			1602		275	1611	1352
Peak-hour factor, PHF	0.91	0.96	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	426	0	205	16	0	16	0	518	16	16	513	200
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	426	0	205	0	32	0	0	534	0	16	513	200
Confl. Peds. (#/hr)									47	47		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	0%	21%	100%	0%	100%	0%	5%	100%	100%	8%	7%
Turn Type	Split		Perm	Split	NA			NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases			4							6		6
Actuated Green, G (s)	28.0		28.0		4.8			42.8		47.2	47.2	47.2
Effective Green, g (s)	28.0		28.0		4.8			42.8		47.2	47.2	47.2
Actuated g/C Ratio	0.28		0.28		0.05			0.43		0.47	0.47	0.47
Clearance Time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Vehicle Extension (s)	3.0		3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	449		342		39			685		142	760	638
v/s Ratio Prot	c0.27				c0.04			c0.33		0.00	c0.32	
v/s Ratio Perm			0.17							0.05		0.15
v/c Ratio	0.95		0.60		0.82			0.78		0.11	0.68	0.31
Uniform Delay, d1	35.3		31.1		47.2			24.6		15.3	20.5	16.4
Progression Factor	1.00		1.00		1.00			1.08		0.76	0.89	0.87
Incremental Delay, d2	31.4		7.6		76.9			5.5		0.3	4.0	1.1
Delay (s)	66.7		38.7		124.1			32.2		11.9	22.1	15.3
Level of Service	E		D		F			C		B	C	B
Approach Delay (s)		57.6			124.1			32.2			20.0	
Approach LOS		E			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. □ S Archer Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↱			↱	
Volume (vph)	172	1087	24	78	630	77	0	368	131	0	294	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1604	4630		1573	4323			1406			1523	
Flt Permitted	0.25	1.00		0.14	1.00			1.00			1.00	
Satd. Flow (perm)	417	4630		227	4323			1406			1523	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	189	1195	26	86	692	85	0	404	144	0	323	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	189	1221	0	86	777	0	0	548	0	0	389	0
Confl. Peds. (#/hr)	5		32	32		5			27			19
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	3%	2%	8%	5%	4%	4%	100%	7%	5%	7%	12%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	45.6	37.0		39.2	33.6			44.4			44.4	
Effective Green, g (s)	45.6	37.0		39.2	33.6			44.4			44.4	
Actuated g/C Ratio	0.46	0.37		0.39	0.34			0.44			0.44	
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	296	1713		164	1452			624			676	
v/s Ratio Prot	c0.06	c0.26		0.03	0.18			c0.39			0.26	
v/s Ratio Perm	0.23			0.18								
v/c Ratio	0.64	0.71		0.52	0.54			0.88			0.58	
Uniform Delay, d1	17.6	27.0		20.6	26.9			25.3			20.8	
Progression Factor	1.00	1.00		1.00	1.00			0.78			0.85	
Incremental Delay, d2	6.2	1.4		3.0	1.4			15.3			2.7	
Delay (s)	23.8	28.4		23.6	28.3			35.1			20.5	
Level of Service	C	C		C	C			D			C	
Approach Delay (s)		27.8			27.8			35.1			20.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1115: Ashland Ave. □ W Robinson St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑			↱	
Volume (vph)	0	0	0	31	22	9	111	476	16	0	270	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	2.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	
Frpb, ped/bikes					1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes					0.98	1.00	0.99	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.98	
Flt Protected					0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1600	1490	1289	1616			1500	
Flt Permitted					0.97	1.00	0.52	1.00			1.00	
Satd. Flow (perm)					1600	1490	707	1616			1500	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	34	24	10	122	523	18	0	297	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	58	10	122	541	0	0	363	0
Confl. Peds. (#/hr)			5	5		1	17		6			17
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	9%	0%	27%	7%	6%	3%	13%	8%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					7.9	7.9	86.1	84.1			71.1	
Effective Green, g (s)					7.9	7.9	86.1	84.1			71.1	
Actuated g/C Ratio					0.08	0.08	0.86	0.84			0.71	
Clearance Time (s)					4.0	4.0	2.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					126	117	672	1359			1066	
v/s Ratio Prot							0.02	c0.33			0.24	
v/s Ratio Perm					0.04	0.01	0.14					
v/c Ratio					0.46	0.09	0.18	0.40			0.34	
Uniform Delay, d1					44.0	42.7	1.8	1.9			5.5	
Progression Factor					1.00	1.00	0.52	0.56			0.34	
Incremental Delay, d2					2.7	0.3	0.1	0.8			0.7	
Delay (s)					46.7	43.0	1.1	1.9			2.6	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			46.1			1.7			2.6	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✣			↑			↑	
Volume (vph)	52	45	29	0	0	26	0	367	2	0	245	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99			0.98			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.94			0.86			1.00			1.00	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1706	1675			1279			1010			1343	
Flt Permitted	0.74	1.00			1.00			1.00			1.00	
Satd. Flow (perm)	1326	1675			1279			1010			1343	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.91	0.92	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	57	49	32	0	0	29	0	403	2	0	269	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	57	81	0	0	29	0	0	405	0	0	269	0
Confl. Peds. (#/hr)	1		3			1			3			3
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	2%	2%	19%	2%	12%	0%	14%	14%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	21.0	21.0			21.0			71.0			71.0	
Effective Green, g (s)	21.0	21.0			21.0			71.0			71.0	
Actuated g/C Ratio	0.21	0.21			0.21			0.71			0.71	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	278	351			268			717			953	
v/s Ratio Prot		c0.05			0.02			c0.40			0.20	
v/s Ratio Perm	0.04											
v/c Ratio	0.21	0.23			0.11			0.56			0.28	
Uniform Delay, d1	32.6	32.8			31.9			7.0			5.3	
Progression Factor	1.00	1.00			1.00			0.45			0.44	
Incremental Delay, d2	1.7	1.5			0.8			2.7			0.7	
Delay (s)	34.3	34.3			32.7			5.9			3.1	
Level of Service	C	C			C			A			A	
Approach Delay (s)		34.3			32.7			5.9			3.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1121: Ashland Ave. □ W 35th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱	↱		↑	↱		↑	↱
Volume (vph)	56	267	78	37	145	91	0	419	24	0	241	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97		1.00	0.95		1.00	0.95
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1588	1514	1216	1588	1370	1108		1139	991		1099	1007
Flt Permitted	0.59	1.00	1.00	0.42	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	989	1514	1216	707	1370	1108		1139	991		1099	1007
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	62	293	86	41	159	100	0	460	26	0	265	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	62	293	86	41	169	90	0	460	26	0	265	7
Confl. Peds. (#/hr)	3		4	4		3			8			10
Confl. Bikes (#/hr)						1			2			3
Heavy Vehicles (%)	0%	11%	14%	0%	15%	19%	14%	13%	4%	17%	14%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0		60.0	60.0		60.0	60.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0		60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31		0.60	0.60		0.60	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	306	469	376	219	424	343		683	594		659	604
v/s Ratio Prot		c0.19			0.12			c0.40			0.24	
v/s Ratio Perm	0.06		0.07	0.06		0.08			0.03			0.01
v/c Ratio	0.20	0.62	0.23	0.19	0.40	0.26		0.67	0.04		0.40	0.01
Uniform Delay, d1	25.4	29.5	25.6	25.3	27.2	25.9		13.4	8.2		10.5	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.53	0.64		0.69	0.74
Incremental Delay, d2	1.5	6.2	1.4	1.9	2.8	1.9		4.4	0.1		1.8	0.0
Delay (s)	26.9	35.7	27.0	27.2	29.9	27.8		11.5	5.4		9.1	6.0
Level of Service	C	D	C	C	C	C		B	A		A	A
Approach Delay (s)		32.8			28.9			11.2			9.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1123: Ashland Ave. □ W 37th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	34	34	34	10	21	21	0	553	14	0	426	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.95			0.95			1.00			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1550			1290			1419			1407	
Flt Permitted		0.88			0.95			1.00			1.00	
Satd. Flow (perm)		1395			1236			1419			1407	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	37	37	37	11	23	23	0	608	15	0	468	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	57	0	0	623	0	0	486	0
Confl. Peds. (#/hr)	10		2	2		10			2			7
Heavy Vehicles (%)	0%	21%	0%	20%	0%	59%	5%	10%	7%	19%	11%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		14.3			14.3			76.7			76.7	
Effective Green, g (s)		14.3			14.3			76.7			76.7	
Actuated g/C Ratio		0.14			0.14			0.77			0.77	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		199			176			1088			1079	
v/s Ratio Prot								c0.44			0.35	
v/s Ratio Perm		c0.08			0.05							
v/c Ratio		0.56			0.32			0.57			0.45	
Uniform Delay, d1		39.9			38.5			4.8			4.1	
Progression Factor		1.00			1.00			0.98			0.59	
Incremental Delay, d2		5.7			2.2			1.9			1.3	
Delay (s)		45.6			40.7			6.6			3.8	
Level of Service		D			D			A			A	
Approach Delay (s)		45.6			40.7			6.6			3.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1127: Ashland Ave. □ W Pershing Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	28	329	111	108	369	164	0	482	67	0	367	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1450	2926	1345	1333	2875	992		1294	1134		1253	1106
Flt Permitted	0.51	1.00	1.00	0.38	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	784	2926	1345	527	2875	992		1294	1134		1253	1106
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	31	362	122	119	405	180	0	530	74	0	403	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	31	362	122	119	405	180	0	530	74	0	403	20
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	14%	13%	10%	24%	15%	46%	1%	21%	16%	16%	25%	17%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.8	26.2	26.2	39.2	32.6	32.6		54.8	54.8		54.8	54.8
Effective Green, g (s)	29.8	26.2	26.2	39.2	32.6	32.6		54.8	54.8		54.8	54.8
Actuated g/C Ratio	0.30	0.26	0.26	0.39	0.33	0.33		0.55	0.55		0.55	0.55
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	257	766	352	287	937	323		709	621		686	606
v/s Ratio Prot	0.00	0.12		c0.04	0.14			c0.41			0.32	
v/s Ratio Perm	0.03		0.09	0.12		c0.18			0.07			0.02
v/c Ratio	0.12	0.47	0.35	0.41	0.43	0.56		0.75	0.12		0.59	0.03
Uniform Delay, d1	25.2	31.1	30.0	20.7	26.4	27.8		17.3	10.9		15.1	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.73	0.70		0.91	0.97
Incremental Delay, d2	0.2	2.1	2.7	1.0	1.5	6.8		6.5	0.4		1.2	0.0
Delay (s)	25.4	33.2	32.6	21.7	27.9	34.5		19.1	8.0		14.9	10.1
Level of Service	C	C	C	C	C	C		B	A		B	B
Approach Delay (s)		32.6			28.5			17.8			14.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1130: Ashland Ave. □ W 42nd St. (West)

8/8/2013

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↑	↳	
Volume (vph)	80	33	0	520	308	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	11	11	11	11
Total Lost time (s)	5.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.96			1.00	0.98	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1529			1198	1563	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1529			1198	1563	
Peak-hour factor, PHF	0.91	0.91	0.96	0.91	0.91	0.91
Adj. Flow (vph)	88	36	0	571	338	44
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	124	0	0	571	382	0
Confl. Peds. (#/hr)	2	1				4
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	12%	0%	6%	8%	18%
Parking (#/hr)				34		
Turn Type	NA			NA	NA	
Protected Phases	4			2 9	6	
Permitted Phases						
Actuated Green, G (s)	14.5			75.5	68.5	
Effective Green, g (s)	14.5			75.5	68.5	
Actuated g/C Ratio	0.14			0.76	0.68	
Clearance Time (s)	5.0				3.0	
Vehicle Extension (s)	8.0				3.0	
Lane Grp Cap (vph)	221			904	1070	
v/s Ratio Prot	c0.08			c0.48	0.24	
v/s Ratio Perm						
v/c Ratio	0.56			0.63	0.36	
Uniform Delay, d1	39.8			5.7	6.6	
Progression Factor	1.00			0.08	0.94	
Incremental Delay, d2	9.2			1.1	0.9	
Delay (s)	49.0			1.6	7.0	
Level of Service	D			A	A	
Approach Delay (s)	49.0			1.6	7.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑			↱	
Volume (vph)	8	2	5	2	3	2	0	589	0	0	497	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.96			1.00			0.99	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1578			1493			1477			1401	
Flt Permitted		0.88			0.95			1.00			1.00	
Satd. Flow (perm)		1436			1441			1477			1401	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	9	2	5	2	3	2	0	647	0	0	546	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	16	0	0	7	0	0	647	0	0	575	0
Confl. Peds. (#/hr)									5			13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	50%	0%	0%	0%	50%	2%	6%	0%	67%	10%	23%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6 13	
Permitted Phases	4			8								
Actuated Green, G (s)		14.5			14.5			68.5			75.5	
Effective Green, g (s)		14.5			14.5			68.5			75.5	
Actuated g/C Ratio		0.14			0.14			0.68			0.76	
Clearance Time (s)		5.0			5.0			3.0				
Vehicle Extension (s)		8.0			8.0			3.0				
Lane Grp Cap (vph)		208			208			1011			1057	
v/s Ratio Prot								c0.44			c0.41	
v/s Ratio Perm		c0.01			0.00							
v/c Ratio		0.08			0.03			0.64			0.54	
Uniform Delay, d1		37.0			36.7			8.8			5.1	
Progression Factor		1.00			1.00			0.75			0.67	
Incremental Delay, d2		0.7			0.3			2.5			0.6	
Delay (s)		37.6			37.0			9.2			4.0	
Level of Service		D			D			A			A	
Approach Delay (s)		37.6			37.0			9.2			4.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1132: Ashland Ave. □ W 43rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	106	248	56	24	115	66	0	459	42	0	277	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98		1.00	0.98		1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1503	1423		1457	1527	1247		1272	986		1176	886
Flt Permitted	0.68	1.00		0.40	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	1070	1423		616	1527	1247		1272	986		1176	886
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	116	273	62	26	126	73	0	504	46	0	304	80
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	116	335	0	26	126	73	0	504	46	0	304	80
Confl. Peds. (#/hr)	1		14	14		1			1			8
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	16%	4%	8%	10%	12%	3%	4%	10%	22%	8%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	35.0	35.0		35.0	35.0	35.0		56.0	56.0		56.0	56.0
Effective Green, g (s)	35.0	35.0		35.0	35.0	35.0		56.0	56.0		56.0	56.0
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35		0.56	0.56		0.56	0.56
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	374	498		215	534	436		712	552		658	496
v/s Ratio Prot		c0.24			0.08			c0.40			0.26	
v/s Ratio Perm	0.11			0.04		0.06			0.05			0.09
v/c Ratio	0.31	0.67		0.12	0.24	0.17		0.71	0.08		0.46	0.16
Uniform Delay, d1	23.7	27.6		22.1	23.0	22.4		16.0	10.2		13.1	10.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.60	0.78		0.49	0.54
Incremental Delay, d2	2.1	7.1		1.1	1.0	0.8		4.7	0.2		2.0	0.6
Delay (s)	25.8	34.7		23.2	24.1	23.3		14.4	8.2		8.4	6.4
Level of Service	C	C		C	C	C		B	A		A	A
Approach Delay (s)		32.4			23.7			13.9			8.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	38	15	20	13	9	0	582	43	0	400	39
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.97			1.00			1.00			1.00	
Frt		0.98			0.97			0.99			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1616			1457			1347			1074	
Flt Permitted		0.87			0.82			1.00			1.00	
Satd. Flow (perm)		1437			1221			1347			1074	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	35	42	16	22	14	10	0	640	47	0	440	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	0	0	46	0	0	687	0	0	483	0
Confl. Peds. (#/hr)	16		2	2		16			2			9
Heavy Vehicles (%)	0%	5%	7%	10%	0%	44%	14%	5%	2%	10%	10%	10%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		10.6			10.6			80.4			80.4	
Effective Green, g (s)		10.6			10.6			80.4			80.4	
Actuated g/C Ratio		0.11			0.11			0.80			0.80	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		152			129			1082			863	
v/s Ratio Prot								c0.51			0.45	
v/s Ratio Perm		c0.06			0.04							
v/c Ratio		0.61			0.36			0.63			0.56	
Uniform Delay, d1		42.7			41.5			3.9			3.5	
Progression Factor		1.00			1.00			0.24			0.67	
Incremental Delay, d2		10.1			3.5			2.3			2.5	
Delay (s)		52.8			45.0			3.3			4.8	
Level of Service		D			D			A			A	
Approach Delay (s)		52.8			45.0			3.3			4.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1134: Ashland Ave. □ W 45th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	36	20	15	16	10	22	0	489	23	0	275	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			0.99	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.97			0.94			0.99			0.98	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1642			1548			1141			1085	
Flt Permitted		0.85			0.91			1.00			1.00	
Satd. Flow (perm)		1423			1429			1141			1085	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	40	22	16	18	11	24	0	537	25	0	302	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	78	0	0	53	0	0	562	0	0	349	0
Confl. Peds. (#/hr)	15		10	10		15			7			9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	0%	0%	7%	12%	0%	0%	10%	6%	4%	0%	11%	0%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			68.0			68.0	
Effective Green, g (s)		23.0			23.0			68.0			68.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		327			328			775			737	
v/s Ratio Prot								c0.49			0.32	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.24			0.16			0.73			0.47	
Uniform Delay, d1		31.4			30.8			10.1			7.6	
Progression Factor		1.00			1.00			0.57			1.01	
Incremental Delay, d2		1.7			1.1			4.7			1.9	
Delay (s)		33.1			31.8			10.5			9.5	
Level of Service		C			C			B			A	
Approach Delay (s)		33.1			31.8			10.5			9.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1135: Ashland Ave. □ W 46th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	32	52	10	4	14	38	0	473	27	0	251	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.96			0.99			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.99			0.91			0.99			0.98	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1703			1516			1152			995	
Flt Permitted		0.89			0.99			1.00			1.00	
Satd. Flow (perm)		1549			1501			1152			995	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	35	57	11	4	15	42	0	520	30	0	276	45
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	103	0	0	61	0	0	550	0	0	321	0
Confl. Peds. (#/hr)	13		5	5		13			18			11
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	10%	0%	0%	5%	0%	6%	4%	2%	13%	7%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			72.0			72.0	
Effective Green, g (s)		20.0			20.0			72.0			72.0	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		309			300			829			716	
v/s Ratio Prot								c0.48			0.32	
v/s Ratio Perm		c0.07			0.04							
v/c Ratio		0.33			0.20			0.66			0.45	
Uniform Delay, d1		34.3			33.4			7.5			5.8	
Progression Factor		1.00			1.00			0.63			1.05	
Incremental Delay, d2		2.9			1.5			3.4			1.8	
Delay (s)		37.2			34.9			8.1			7.9	
Level of Service		D			C			A			A	
Approach Delay (s)		37.2			34.9			8.1			7.9	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1136: Ashland Ave. □ W 47th St. □ S. McDowell Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↰	↑	↱	↗	↓	↙
Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	100	293	40	60	256	48	7	361	0	72	192	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.93		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1425	2701		1527	2712			1071	1328		1398	1126
Flt Permitted	0.45	1.00		0.51	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	670	2701		812	2712			1071	1328		1398	1126
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	110	322	44	66	281	53	8	397	0	79	211	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	110	366	0	66	342	0	0	397	79	0	211	65
Confl. Peds. (#/hr)			27	27		51				33		44
Heavy Vehicles (%)	12%	16%	8%	3%	12%	15%	0%	4%	0%	4%	12%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								52			0	0
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	35.7	28.8		31.5	26.7			54.4	54.4		54.4	54.4
Effective Green, g (s)	35.7	28.8		31.5	26.7			54.4	54.4		54.4	54.4
Actuated g/C Ratio	0.36	0.29		0.32	0.27			0.54	0.54		0.54	0.54
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	291	777		290	724			582	722		760	612
v/s Ratio Prot	c0.03	c0.14		0.01	0.13			c0.37			0.15	
v/s Ratio Perm	0.11			0.06					0.06			0.06
v/c Ratio	0.38	0.47		0.23	0.47			0.68	0.11		0.28	0.11
Uniform Delay, d1	22.6	29.3		24.5	30.7			16.5	11.1		12.2	11.0
Progression Factor	1.00	1.00		1.00	1.00			0.41	0.29		0.60	0.67
Incremental Delay, d2	0.8	2.0		0.4	2.2			4.0	0.2		0.8	0.3
Delay (s)	23.4	31.4		24.9	32.9			10.8	3.4		8.2	7.7
Level of Service	C	C		C	C			B	A		A	A
Approach Delay (s)		29.5			31.7			9.6			8.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SWR2
Lane Configurations	↱
Volume (vph)	3
Ideal Flow (vphpl)	1800
Lane Width	12
Total Lost time (s)	5.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	1557
Flt Permitted	1.00
Satd. Flow (perm)	1557
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	3
RTOR Reduction (vph)	0
Lane Group Flow (vph)	3
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	26.7
Effective Green, g (s)	26.7
Actuated g/C Ratio	0.27
Clearance Time (s)	5.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	415
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	26.9
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	26.9
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1137: Ashland Ave. □ W 48th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣			↑			↱	
Volume (vph)	0	0	0	16	55	16	0	582	0	0	250	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.98	
Flpb, ped/bikes					0.98			1.00			1.00	
Frt					0.97			1.00			0.98	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1594			1205			1014	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1594			1205			1014	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	18	60	18	0	640	0	0	275	57
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	96	0	0	640	0	0	332	0
Confl. Peds. (#/hr)			56	56		33			2			19
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	4%	12%	9%	4%	0%	0%	7%	8%
Parking (#/hr)								36			50	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			68.0			68.0	
Effective Green, g (s)					23.0			68.0			68.0	
Actuated g/C Ratio					0.23			0.68			0.68	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					366			819			689	
v/s Ratio Prot								c0.53			0.33	
v/s Ratio Perm					0.06							
v/c Ratio					0.26			0.78			0.48	
Uniform Delay, d1					31.5			10.9			7.6	
Progression Factor					1.00			0.76			0.65	
Incremental Delay, d2					1.7			6.5			2.3	
Delay (s)					33.3			14.8			7.3	
Level of Service					C			B			A	
Approach Delay (s)		0.0			33.3			14.8			7.3	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1138: Ashland Ave. □ W 49th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	48	40	30	16	19	10	0	410	37	0	197	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.97			0.99			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1697			1634			1112			1029	
Flt Permitted		0.86			0.89			1.00			1.00	
Satd. Flow (perm)		1496			1481			1112			1029	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	53	44	33	18	21	11	0	451	41	0	216	23
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	130	0	0	50	0	0	492	0	0	239	0
Confl. Peds. (#/hr)	5					5			14			4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	12%	0%	0%	0%	5%	0%	0%	9%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			67.0			67.0	
Effective Green, g (s)		24.0			24.0			67.0			67.0	
Actuated g/C Ratio		0.24			0.24			0.67			0.67	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		359			355			745			689	
v/s Ratio Prot								c0.44			0.23	
v/s Ratio Perm		c0.09			0.03							
v/c Ratio		0.36			0.14			0.66			0.35	
Uniform Delay, d1		31.6			29.9			9.8			7.1	
Progression Factor		1.00			1.00			0.59			0.34	
Incremental Delay, d2		2.8			0.8			3.6			1.2	
Delay (s)		34.4			30.7			9.3			3.7	
Level of Service		C			C			A			A	
Approach Delay (s)		34.4			30.7			9.3			3.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1139: Ashland Ave. □ W 50th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	26	34	8	16	18	26	0	450	15	0	211	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.97			1.00			0.99	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.98			0.94			1.00			0.98	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1697			1607			1112			1387	
Flt Permitted		0.88			0.93			1.00			1.00	
Satd. Flow (perm)		1529			1507			1112			1387	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	29	37	9	18	20	29	0	495	16	0	232	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	75	0	0	67	0	0	511	0	0	262	0
Confl. Peds. (#/hr)	19		26	26		19			8			8
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	12%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			68.0			68.0	
Effective Green, g (s)		23.0			23.0			68.0			68.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		351			346			756			943	
v/s Ratio Prot								c0.46			0.19	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.21			0.19			0.68			0.28	
Uniform Delay, d1		31.2			31.0			9.5			6.3	
Progression Factor		1.00			1.00			0.42			0.55	
Incremental Delay, d2		1.4			1.2			4.2			0.7	
Delay (s)		32.6			32.3			8.1			4.2	
Level of Service		C			C			A			A	
Approach Delay (s)		32.6			32.3			8.1			4.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1140: Ashland Ave. □ W 51st St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	112	318	29	46	196	55	0	349	40	0	168	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.96		1.00	0.94		1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1519	1556	1259	1510	1585	1287		1154	926		983	867
Flt Permitted	0.56	1.00	1.00	0.40	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	901	1556	1259	636	1585	1287		1154	926		983	867
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	123	349	32	51	215	60	0	384	44	0	185	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	123	349	32	51	215	60	0	384	44	0	185	38
Confl. Peds. (#/hr)	5		12	12		5			14			4
Heavy Vehicles (%)	4%	8%	7%	4%	6%	7%	3%	4%	2%	8%	15%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	37.0	37.0	37.0	37.0	37.0	37.0		54.0	54.0		54.0	54.0
Effective Green, g (s)	37.0	37.0	37.0	37.0	37.0	37.0		54.0	54.0		54.0	54.0
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37		0.54	0.54		0.54	0.54
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	333	575	465	235	586	476		623	500		530	468
v/s Ratio Prot		c0.22			0.14			c0.33			0.19	
v/s Ratio Perm	0.14		0.03	0.08		0.05			0.05			0.04
v/c Ratio	0.37	0.61	0.07	0.22	0.37	0.13		0.62	0.09		0.35	0.08
Uniform Delay, d1	23.0	25.6	20.4	21.6	23.0	20.8		15.9	11.1		13.0	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.17	0.27		0.72	0.70
Incremental Delay, d2	3.1	4.7	0.3	2.1	1.8	0.5		3.7	0.3		1.8	0.3
Delay (s)	26.1	30.3	20.6	23.7	24.7	21.4		6.4	3.3		11.1	8.1
Level of Service	C	C	C	C	C	C		A	A		B	A
Approach Delay (s)		28.7			23.9			6.1			10.6	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	8	9	13	0	451	0	0	196	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.94			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1590			1205			1021	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1590			1205			1021	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	9	10	14	0	496	0	0	215	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	33	0	0	496	0	0	233	0
Confl. Peds. (#/hr)			13	13		2			13			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	8%	0%	4%	0%	20%	11%	12%
Parking (#/hr)								36			48	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			68.0			68.0	
Effective Green, g (s)					23.0			68.0			68.0	
Actuated g/C Ratio					0.23			0.68			0.68	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					365			819			694	
v/s Ratio Prot								c0.41			0.23	
v/s Ratio Perm					0.02							
v/c Ratio					0.09			0.61			0.34	
Uniform Delay, d1					30.3			8.7			6.6	
Progression Factor					1.00			0.23			0.71	
Incremental Delay, d2					0.5			2.7			1.3	
Delay (s)					30.8			4.8			6.0	
Level of Service					C			A			A	
Approach Delay (s)		0.0			30.8			4.8			6.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1144: Ashland Ave. □ W Garfield Blvd. (WB)

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑			↑	↱
Volume (vph)	0	0	0	138	738	29	0	427	0	0	152	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	11	11	11	11	11	11
Total Lost time (s)				5.0	5.0	5.0		3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes				1.00	1.00	0.89		1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00		1.00			1.00	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1524	3069	1266		1477			1084	970
Flt Permitted				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1524	3069	1266		1477			1084	970
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	152	811	32	0	469	0	0	167	77
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	152	811	32	0	469	0	0	167	77
Confl. Peds. (#/hr)						57			12			14
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	4%	6%	0%	0%	14%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm		NA			NA	Perm
Protected Phases					8			2 5			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				40.0	40.0	40.0		46.0			43.0	43.0
Effective Green, g (s)				40.0	40.0	40.0		46.0			43.0	43.0
Actuated g/C Ratio				0.40	0.40	0.40		0.46			0.43	0.43
Clearance Time (s)				5.0	5.0	5.0					3.0	3.0
Lane Grp Cap (vph)				609	1227	506		679			466	417
v/s Ratio Prot					c0.26			c0.32			0.15	
v/s Ratio Perm				0.10		0.03						0.08
v/c Ratio				0.25	0.66	0.06		0.69			0.36	0.18
Uniform Delay, d1				20.0	24.5	18.5		21.4			19.2	17.6
Progression Factor				1.00	1.00	1.00		0.38			1.09	1.11
Incremental Delay, d2				1.0	2.8	0.2		4.2			2.1	1.0
Delay (s)				21.0	27.3	18.7		12.3			23.0	20.5
Level of Service				C	C	B		B			C	C
Approach Delay (s)		0.0			26.0			12.3			22.2	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1145: Ashland Ave. □ W Garfield Blvd. (EB)

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱					↑	↱		↑	
Volume (vph)	76	936	63	0	0	0	0	376	164	0	254	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0		5.0	
Lane Util. Factor	1.00	0.95	1.00					1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.90					1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1477	3011	1191					1248	1077		1437	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1477	3011	1191					1248	1077		1437	
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	84	1029	69	0	0	0	0	413	180	0	279	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	1029	69	0	0	0	0	413	180	0	279	0
Confl. Peds. (#/hr)	1		48			1			10			6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	6%	8%	0%	0%	0%	0%	6%	2%	4%	9%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			1 6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	40.0	40.0	40.0					42.0	42.0		48.0	
Effective Green, g (s)	40.0	40.0	40.0					42.0	42.0		48.0	
Actuated g/C Ratio	0.40	0.40	0.40					0.42	0.42		0.48	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0			
Lane Grp Cap (vph)	590	1204	476					524	452		689	
v/s Ratio Prot		c0.34						c0.33			c0.19	
v/s Ratio Perm	0.06		0.06						0.17			
v/c Ratio	0.14	0.85	0.14					0.79	0.40		0.40	
Uniform Delay, d1	19.1	27.3	19.1					25.1	20.2		16.8	
Progression Factor	1.00	1.00	1.00					0.92	0.99		1.21	
Incremental Delay, d2	0.5	7.8	0.6					7.5	1.7		1.7	
Delay (s)	19.6	35.2	19.7					30.6	21.8		22.0	
Level of Service	B	D	B					C	C		C	
Approach Delay (s)		33.2			0.0			27.9			22.0	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1148: Ashland Ave. □ W 57th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	22	10	34	0	0	0	0	592	8	0	261	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.97						1.00			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.93						1.00			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1544						1167			1063	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1544						1167			1063	
Peak-hour factor, PHF	0.91	0.91	0.91	0.95	0.95	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	24	11	37	0	0	0	0	651	9	0	287	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	72	0	0	0	0	0	660	0	0	287	0
Confl. Peds. (#/hr)	7		17			7			10			23
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	4%	12%	0%	8%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						68.0			68.0	
Effective Green, g (s)		23.0						68.0			68.0	
Actuated g/C Ratio		0.23						0.68			0.68	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		355						793			722	
v/s Ratio Prot								c0.57			0.27	
v/s Ratio Perm		0.05										
v/c Ratio		0.20						0.83			0.40	
Uniform Delay, d1		31.1						11.8			7.0	
Progression Factor		1.00						0.37			0.92	
Incremental Delay, d2		1.3						7.4			1.5	
Delay (s)		32.4						11.8			8.0	
Level of Service		C						B			A	
Approach Delay (s)		32.4			0.0			11.8			8.0	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1150: Ashland Ave. □ W 59th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	76	302	39	51	273	37	0	505	33	0	245	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.79	1.00	1.00	0.96		1.00	0.98		1.00	0.90
Flpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1432	1527	1070	1493	1615	1266		1288	1099		1437	1089
Flt Permitted	0.41	1.00	1.00	0.36	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	617	1527	1070	573	1615	1266		1288	1099		1437	1089
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	84	332	43	56	300	41	0	555	36	0	269	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	332	43	56	300	41	0	555	36	0	269	36
Confl. Peds. (#/hr)	7		63	63		7			1			25
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	11%	10%	5%	4%	4%	8%	2%	4%	0%	7%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.6	30.6	30.6	34.6	30.6	30.6		53.4	53.4		53.4	53.4
Effective Green, g (s)	34.6	30.6	30.6	34.6	30.6	30.6		53.4	53.4		53.4	53.4
Actuated g/C Ratio	0.35	0.31	0.31	0.35	0.31	0.31		0.53	0.53		0.53	0.53
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	246	467	327	235	494	387		687	586		767	581
v/s Ratio Prot	c0.01	c0.22		0.01	0.19			c0.43			0.19	
v/s Ratio Perm	0.10		0.04	0.07		0.03			0.03			0.03
v/c Ratio	0.34	0.71	0.13	0.24	0.61	0.11		0.81	0.06		0.35	0.06
Uniform Delay, d1	23.3	30.8	25.1	22.8	29.6	24.9		19.1	11.2		13.4	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.65	0.92		0.63	0.68
Incremental Delay, d2	0.8	8.9	0.8	0.5	5.5	0.6		6.1	0.1		1.2	0.2
Delay (s)	24.1	39.7	25.9	23.4	35.0	25.4		18.4	10.4		9.6	7.9
Level of Service	C	D	C	C	D	C		B	B		A	A
Approach Delay (s)		35.5			32.4			18.0			9.4	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1152: Ashland Ave. □ W 61st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣						↱			↑	
Volume (vph)	32	32	85	0	0	0	0	572	45	0	309	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.92						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1749						1232			1015	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1749						1232			1015	
Peak-hour factor, PHF	0.91	0.91	0.91	0.99	0.99	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	35	35	93	0	0	0	0	629	49	0	340	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	163	0	0	0	0	0	678	0	0	340	0
Confl. Peds. (#/hr)	6		7			6			16			24
Heavy Vehicles (%)	19%	0%	0%	0%	0%	0%	0%	3%	2%	14%	8%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						68.0			68.0	
Effective Green, g (s)		23.0						68.0			68.0	
Actuated g/C Ratio		0.23						0.68			0.68	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		402						837			690	
v/s Ratio Prot								c0.55			0.33	
v/s Ratio Perm		0.09										
v/c Ratio		0.41						0.81			0.49	
Uniform Delay, d1		32.7						11.4			7.7	
Progression Factor		1.00						1.00			0.93	
Incremental Delay, d2		3.0						8.4			2.4	
Delay (s)		35.7						19.8			9.6	
Level of Service		D						B			A	
Approach Delay (s)		35.7			0.0			19.8			9.6	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1154: Ashland Ave. □ W 63rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	59	493	83	71	462	44	0	475	60	0	311	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	10	10	12	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00			1.00	0.90		1.00	0.91
Flpb, ped/bikes	0.99	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1488	1527	1178	1457	1580			1673	1145		1626	1208
Flt Permitted	0.31	1.00	1.00	0.32	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	479	1527	1178	488	1580			1673	1145		1626	1208
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	65	542	91	78	508	48	0	522	66	0	342	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	542	91	78	556	0	0	522	66	0	342	49
Confl. Peds. (#/hr)	19		76	76		19			42			37
Heavy Vehicles (%)	14%	10%	9%	6%	5%	0%	5%	4%	3%	2%	7%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0			
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0			27.0	27.0		27.0	27.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0			27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48			0.42	0.42		0.42	0.42
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	228	728	561	232	753			694	475		675	501
v/s Ratio Prot		c0.35			0.35			c0.31			0.21	
v/s Ratio Perm	0.14		0.08	0.16					0.06			0.04
v/c Ratio	0.29	0.74	0.16	0.34	0.74			0.75	0.14		0.51	0.10
Uniform Delay, d1	10.3	13.8	9.6	10.6	13.7			16.2	11.8		14.1	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.78	0.69		1.00	1.00
Incremental Delay, d2	3.1	6.8	0.6	3.9	6.4			6.1	0.5		2.7	0.4
Delay (s)	13.4	20.6	10.3	14.5	20.1			18.8	8.6		16.8	12.0
Level of Service	B	C	B	B	C			B	A		B	B
Approach Delay (s)		18.6			19.4			17.7			16.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↱	
Volume (vph)	0	0	0	36	14	56	0	612	0	0	246	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.93			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1710			1422			1141	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1710			1422			1141	
Peak-hour factor, PHF	0.95	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	40	15	62	0	673	0	0	270	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	117	0	0	673	0	0	297	0
Confl. Peds. (#/hr)			22	22		6			27			26
Heavy Vehicles (%)	0%	0%	0%	6%	0%	2%	0%	4%	0%	0%	8%	4%
Parking (#/hr)								10			36	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					8.0			48.0			48.0	
Effective Green, g (s)					8.0			48.0			48.0	
Actuated g/C Ratio					0.12			0.74			0.74	
Clearance Time (s)					5.0			4.0			4.0	
Vehicle Extension (s)					5.0			3.0			3.0	
Lane Grp Cap (vph)					210			1050			842	
v/s Ratio Prot								c0.47			0.26	
v/s Ratio Perm					0.07							
v/c Ratio					0.56			0.64			0.35	
Uniform Delay, d1					26.8			4.2			3.0	
Progression Factor					1.00			1.00			0.27	
Incremental Delay, d2					5.4			3.0			1.1	
Delay (s)					32.2			7.2			1.9	
Level of Service					C			A			A	
Approach Delay (s)		0.0			32.2			7.2			1.9	
Approach LOS		A			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	48.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
1158: Ashland Ave. □ W Marquette Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	94	360	40	66	260	63	0	479	25	0	247	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96		1.00			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1532	1663	1373	1490	1631	1349		1223			1082	
Flt Permitted	0.47	1.00	1.00	0.33	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	751	1663	1373	511	1631	1349		1223			1082	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	103	396	44	73	286	69	0	526	27	0	271	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	103	396	44	73	286	69	0	553	0	0	298	0
Confl. Peds. (#/hr)	11		12	12		11			20			18
Heavy Vehicles (%)	0%	1%	0%	3%	3%	2%	0%	0%	0%	10%	7%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.6	30.6	30.6	34.6	30.6	30.6		42.4			42.4	
Effective Green, g (s)	34.6	30.6	30.6	34.6	30.6	30.6		42.4			42.4	
Actuated g/C Ratio	0.38	0.34	0.34	0.38	0.34	0.34		0.47			0.47	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	323	565	466	239	554	458		576			509	
v/s Ratio Prot	c0.01	c0.24		0.01	0.18			c0.45			0.28	
v/s Ratio Perm	0.11		0.03	0.10		0.05						
v/c Ratio	0.32	0.70	0.09	0.31	0.52	0.15		0.96			0.59	
Uniform Delay, d1	18.5	25.7	20.3	18.8	23.8	20.7		23.0			17.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.77			1.00	
Incremental Delay, d2	0.6	7.1	0.4	0.7	3.4	0.7		23.4			4.9	
Delay (s)	19.1	32.8	20.7	19.5	27.2	21.4		41.1			22.2	
Level of Service	B	C	C	B	C	C		D			C	
Approach Delay (s)		29.2			24.9			41.1			22.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1160: Ashland Ave. □ W 69th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑	↱		↑	↱		↑	↱
Volume (vph)	76	357	49	44	197	30	0	439	41	0	275	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.89		1.00	0.91		1.00	0.90
Flpb, ped/bikes		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Frt		0.98			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		3032			1595	1283		1138	1324		1018	1252
Flt Permitted		0.78			0.82	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		2374			1312	1283		1138	1324		1018	1252
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	84	392	54	48	216	33	0	482	45	0	302	56
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	530	0	0	264	33	0	482	45	0	302	56
Confl. Peds. (#/hr)	47		48	48		47			48			32
Heavy Vehicles (%)	0%	6%	0%	0%	9%	3%	6%	4%	2%	4%	6%	6%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)		28.0			28.0	28.0		53.0	53.0		53.0	53.0
Effective Green, g (s)		28.0			28.0	28.0		53.0	53.0		53.0	53.0
Actuated g/C Ratio		0.31			0.31	0.31		0.59	0.59		0.59	0.59
Clearance Time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		738			408	399		670	779		599	737
v/s Ratio Prot								c0.42			0.30	
v/s Ratio Perm		c0.22			0.20	0.03			0.03			0.04
v/c Ratio		0.72			0.65	0.08		0.72	0.06		0.50	0.08
Uniform Delay, d1		27.5			26.7	21.9		13.2	7.9		10.8	8.0
Progression Factor		1.00			1.00	1.00		0.67	0.96		0.58	0.41
Incremental Delay, d2		5.9			7.7	0.4		4.8	0.1		2.8	0.2
Delay (s)		33.4			34.5	22.3		13.6	7.7		9.1	3.4
Level of Service		C			C	C		B	A		A	A
Approach Delay (s)		33.4			33.1			13.1			8.2	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. □ W 71st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	73	326	32	40	322	65	0	526	13	0	263	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.94		1.00			1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1586	1647	1316	1512	1615	1315		1413			1468	
Flt Permitted	0.34	1.00	1.00	0.37	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	568	1647	1316	590	1615	1315		1413			1468	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	80	358	35	44	354	71	0	578	14	0	289	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	80	358	35	44	354	71	0	592	0	0	319	0
Confl. Peds. (#/hr)	24		18	18		24			7			8
Heavy Vehicles (%)	0%	2%	3%	5%	4%	2%	8%	4%	15%	7%	5%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	33.2	29.2	29.2	31.2	28.2	28.2		45.8			45.8	
Effective Green, g (s)	33.2	29.2	29.2	31.2	28.2	28.2		45.8			45.8	
Actuated g/C Ratio	0.37	0.32	0.32	0.35	0.31	0.31		0.51			0.51	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	254	534	426	235	506	412		719			747	
v/s Ratio Prot	c0.01	0.22		0.01	c0.22			c0.42			0.22	
v/s Ratio Perm	0.10		0.03	0.06		0.05						
v/c Ratio	0.31	0.67	0.08	0.19	0.70	0.17		0.82			0.43	
Uniform Delay, d1	19.6	26.2	21.1	20.3	27.2	22.4		18.7			13.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.40			1.28	
Incremental Delay, d2	0.7	6.6	0.4	0.4	7.8	0.9		8.7			1.5	
Delay (s)	20.3	32.8	21.5	20.7	35.0	23.3		16.2			19.2	
Level of Service	C	C	C	C	D	C		B			B	
Approach Delay (s)		29.9			31.9			16.2			19.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↑	↱		↑	↱
Volume (vph)	51	204	29	29	136	39	0	492	15	0	319	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.92		1.00	0.97		1.00	0.91		1.00	0.92
Flpb, ped/bikes		1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1575	1122		1577	1233		1506	1252		1477	1254
Flt Permitted		0.90	1.00		0.91	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1438	1122		1449	1233		1506	1252		1477	1254
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	56	224	32	32	149	43	0	541	16	0	351	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	280	32	0	181	43	0	541	16	0	351	24
Confl. Peds. (#/hr)	7		33	33		7			27			20
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	22%	6%	17%	0%	6%	12%	9%	4%	7%	5%	6%	9%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		31.0	31.0		31.0	31.0		50.0	50.0		50.0	50.0
Effective Green, g (s)		31.0	31.0		31.0	31.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio		0.34	0.34		0.34	0.34		0.56	0.56		0.56	0.56
Clearance Time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		495	386		499	424		836	695		820	696
v/s Ratio Prot								c0.36			0.24	
v/s Ratio Perm		c0.19	0.03		0.12	0.03			0.01			0.02
v/c Ratio		0.57	0.08		0.36	0.10		0.65	0.02		0.43	0.03
Uniform Delay, d1		24.0	19.9		22.1	20.0		13.9	9.0		11.7	9.1
Progression Factor		1.00	1.00		1.00	1.00		0.83	0.68		0.68	0.60
Incremental Delay, d2		4.6	0.4		2.0	0.5		2.7	0.0		1.6	0.1
Delay (s)		28.6	20.3		24.1	20.5		14.1	6.2		9.5	5.6
Level of Service		C	C		C	C		B	A		A	A
Approach Delay (s)		27.8			23.4			13.9			9.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1170: Ashland Ave. □ W 76th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↑↱			↑↱	
Volume (vph)	46	309	17	44	208	53	0	518	39	0	206	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.99			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		3060			3009			1257			1150	
Flt Permitted		0.86			0.83			1.00			1.00	
Satd. Flow (perm)		2647			2526			1257			1150	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	51	340	19	48	229	58	0	569	43	0	226	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	410	0	0	335	0	0	612	0	0	237	0
Confl. Peds. (#/hr)	1		9	9		1			5			2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	3%	6%	0%	2%	4%	0%	4%	5%	7%	7%	0%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			57.0			57.0	
Effective Green, g (s)		24.0			24.0			57.0			57.0	
Actuated g/C Ratio		0.27			0.27			0.63			0.63	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		705			673			796			728	
v/s Ratio Prot								c0.49			0.21	
v/s Ratio Perm		c0.15			0.13							
v/c Ratio		0.58			0.50			0.77			0.33	
Uniform Delay, d1		28.6			27.9			11.8			7.6	
Progression Factor		1.00			1.00			0.61			1.18	
Incremental Delay, d2		3.5			2.6			5.2			1.1	
Delay (s)		32.1			30.5			12.4			10.1	
Level of Service		C			C			B			B	
Approach Delay (s)		32.1			30.5			12.4			10.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1173: Ashland Ave. □ W 79th St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	111	496	42	36	454	72	0	412	35	0	233	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.92		1.00	0.88		1.00	0.87
Flpb, ped/bikes	0.98	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1489	1541	1178	1413	1527	1159		1165	890		1143	820
Flt Permitted	0.26	1.00	1.00	0.21	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	407	1541	1178	316	1527	1159		1165	890		1143	820
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	122	545	46	40	499	79	0	453	38	0	256	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	122	545	46	40	499	79	0	453	38	0	256	30
Confl. Peds. (#/hr)	41		54	54		41			41			47
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	1%	9%	5%	6%	10%	9%	7%	6%	3%	10%	5%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	35.0	35.0	35.0	35.0	35.0		39.0	39.0		39.0	39.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0		39.0	39.0		39.0	39.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.43	0.43		0.43	0.43
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	158	599	458	122	593	450		504	385		495	355
v/s Ratio Prot		c0.35			0.33			c0.39			0.22	
v/s Ratio Perm	0.30		0.04	0.13		0.07			0.04			0.04
v/c Ratio	0.77	0.91	0.10	0.33	0.84	0.18		0.90	0.10		0.52	0.08
Uniform Delay, d1	24.0	26.0	17.5	19.3	25.0	18.0		23.7	15.1		18.6	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.48	0.41		0.67	0.58
Incremental Delay, d2	29.9	20.2	0.4	7.0	13.5	0.8		15.4	0.3		3.7	0.4
Delay (s)	53.9	46.2	17.9	26.3	38.5	18.9		26.7	6.5		16.1	9.1
Level of Service	D	D	B	C	D	B		C	A		B	A
Approach Delay (s)		45.7			35.2			25.2			15.4	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1175: Ashland Ave. □ W 81st St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↑			↱	
Volume (vph)	0	0	0	26	92	32	0	527	0	0	190	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)					5.0	5.0		4.0			4.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.96		1.00			0.98	
Flpb, ped/bikes					1.00	1.00		1.00			1.00	
Frt					1.00	0.85		1.00			0.98	
Flt Protected					0.99	1.00		1.00			1.00	
Satd. Flow (prot)					1625	1314		1149			1005	
Flt Permitted					0.99	1.00		1.00			1.00	
Satd. Flow (perm)					1625	1314		1149			1005	
Peak-hour factor, PHF	0.94	0.94	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	0	0	0	29	101	35	0	579	0	0	209	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	130	35	0	579	0	0	242	0
Confl. Peds. (#/hr)			11	11		12			5			41
Heavy Vehicles (%)	0%	0%	0%	8%	0%	4%	3%	3%	0%	0%	5%	3%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					23.0	23.0		58.0			58.0	
Effective Green, g (s)					23.0	23.0		58.0			58.0	
Actuated g/C Ratio					0.26	0.26		0.64			0.64	
Clearance Time (s)					5.0	5.0		4.0			4.0	
Lane Grp Cap (vph)					415	335		740			647	
v/s Ratio Prot								c0.50			0.24	
v/s Ratio Perm					0.08	0.03						
v/c Ratio					0.31	0.10		0.78			0.37	
Uniform Delay, d1					27.1	25.6		11.5			7.5	
Progression Factor					1.00	1.00		0.67			0.94	
Incremental Delay, d2					2.0	0.6		6.3			1.6	
Delay (s)					29.1	26.2		14.0			8.6	
Level of Service					C	C		B			A	
Approach Delay (s)		0.0			28.5			14.0			8.6	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1177: Ashland Ave. □ W 83rd St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	59	287	71	52	250	39	0	506	49	0	225	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00			1.00	0.94		1.00	0.98
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1512	1647	1370	1547	3076			1301	1053		1061	917
Flt Permitted	0.53	1.00	1.00	0.38	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	836	1647	1370	621	3076			1301	1053		1061	917
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	65	315	78	57	275	43	0	556	54	0	247	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	315	78	57	318	0	0	556	54	0	247	15
Confl. Peds. (#/hr)	3		12	12		3			18			7
Heavy Vehicles (%)	5%	2%	0%	2%	1%	3%	2%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0			55.0	55.0		55.0	55.0
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0			55.0	55.0		55.0	55.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29			0.61	0.61		0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	241	475	395	179	888			795	643		648	560
v/s Ratio Prot		c0.19			0.10			c0.43			0.23	
v/s Ratio Perm	0.08		0.06	0.09					0.05			0.02
v/c Ratio	0.27	0.66	0.20	0.32	0.36			0.70	0.08		0.38	0.03
Uniform Delay, d1	24.7	28.1	24.1	25.1	25.4			11.9	7.2		8.9	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.66	0.73		0.74	0.94
Incremental Delay, d2	2.7	7.1	1.1	4.6	1.1			3.0	0.2		1.6	0.1
Delay (s)	27.4	35.3	25.3	29.7	26.5			10.8	5.4		8.2	6.6
Level of Service	C	D	C	C	C			B	A		A	A
Approach Delay (s)		32.5			27.0			10.4			8.1	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1179: Ashland Ave. □ W 85th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣						↱			↑	
Volume (vph)	60	47	31	0	0	0	0	597	55	0	318	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1627						1125			1127	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1627						1125			1127	
Peak-hour factor, PHF	0.91	0.91	0.91	0.90	0.90	0.91	0.90	0.91	0.91	0.90	0.91	0.91
Adj. Flow (vph)	66	52	34	0	0	0	0	656	60	0	349	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	152	0	0	0	0	0	716	0	0	349	0
Confl. Peds. (#/hr)	7		8			7			13			11
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	0%	6%	0%	0%	0%	0%	5%	4%	0%	5%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		11.9						69.1			69.1	
Effective Green, g (s)		11.9						69.1			69.1	
Actuated g/C Ratio		0.13						0.77			0.77	
Clearance Time (s)		5.0						4.0			4.0	
Vehicle Extension (s)		6.0						3.0			3.0	
Lane Grp Cap (vph)		215						863			865	
v/s Ratio Prot								c0.64			0.31	
v/s Ratio Perm		0.09										
v/c Ratio		0.71						0.83			0.40	
Uniform Delay, d1		37.4						6.7			3.5	
Progression Factor		1.00						0.56			0.72	
Incremental Delay, d2		14.6						5.0			1.4	
Delay (s)		51.9						8.8			3.9	
Level of Service		D						A			A	
Approach Delay (s)		51.9			0.0			8.8			3.9	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. □ W 87th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	109	1044	115	59	845	151	0	500	26	0	236	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00	0.92		1.00	0.89		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1504	3210	1229	1548	3179	1215		1226	930		1061	882
Flt Permitted	0.15	1.00	1.00	0.12	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	231	3210	1229	201	3179	1215		1226	930		1061	882
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	120	1147	126	65	929	166	0	549	29	0	259	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	120	1147	126	65	929	166	0	549	29	0	259	33
Confl. Peds. (#/hr)	34		53	53		34			92			16
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	6%	3%	3%	3%	4%	8%	3%	5%	4%	3%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.6	33.6	33.6	37.2	32.4	32.4		39.6	39.6		39.6	39.6
Effective Green, g (s)	39.6	33.6	33.6	37.2	32.4	32.4		39.6	39.6		39.6	39.6
Actuated g/C Ratio	0.44	0.37	0.37	0.41	0.36	0.36		0.44	0.44		0.44	0.44
Clearance Time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	186	1198	458	154	1144	437		539	409		466	388
v/s Ratio Prot	c0.04	c0.36		0.02	0.29			c0.45			0.24	
v/s Ratio Perm	0.24		0.10	0.15		0.14			0.03			0.04
v/c Ratio	0.65	0.96	0.28	0.42	0.81	0.38		1.02	0.07		0.56	0.09
Uniform Delay, d1	17.6	27.5	19.7	19.2	26.0	21.4		25.2	14.6		18.7	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.82	0.83		0.93	0.84
Incremental Delay, d2	7.5	17.6	1.5	1.9	6.3	2.5		35.8	0.2		4.3	0.4
Delay (s)	25.1	45.1	21.2	21.1	32.4	23.9		56.6	12.4		21.8	12.7
Level of Service	C	D	C	C	C	C		E	B		C	B
Approach Delay (s)		41.2			30.5			54.3			20.8	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. □ W 91st St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑	↱		↑	↱
Volume (vph)	24	27	24	26	8	53	0	611	13	0	448	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			0.95			1.00	0.95		1.00	0.97
Flpb, ped/bikes		0.99			1.00			1.00	1.00		1.00	1.00
Frt		0.96			0.92			1.00	0.85		1.00	0.85
Flt Protected		0.98			0.99			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1543			1442			1054	1404		1154	1429
Flt Permitted		0.90			0.90			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1404			1324			1054	1404		1154	1429
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	26	30	26	29	9	58	0	671	14	0	492	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	82	0	0	96	0	0	671	14	0	492	8
Confl. Peds. (#/hr)	16		4	4		16			9			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	4%	0%	11%	4%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		12.0			12.0			69.0	69.0		69.0	69.0
Effective Green, g (s)		12.0			12.0			69.0	69.0		69.0	69.0
Actuated g/C Ratio		0.13			0.13			0.77	0.77		0.77	0.77
Clearance Time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		8.0			8.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		187			176			808	1076		884	1095
v/s Ratio Prot								c0.64			0.43	
v/s Ratio Perm		0.06			c0.07				0.01			0.01
v/c Ratio		0.44			0.55			0.83	0.01		0.56	0.01
Uniform Delay, d1		35.9			36.5			6.7	2.5		4.3	2.5
Progression Factor		1.00			1.00			0.73	0.79		0.74	0.77
Incremental Delay, d2		6.9			10.9			7.0	0.0		2.4	0.0
Delay (s)		42.8			47.3			12.0	2.0		5.6	1.9
Level of Service		D			D			B	A		A	A
Approach Delay (s)		42.8			47.3			11.8			5.5	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1191: Ashland Ave. □ W 95th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	178	579	43	62	663	226	0	579	24	0	200	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.93	1.00	0.98			1.00	0.97		1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1533	3149	1372	1497	2945			1520	1271		1520	1155
Flt Permitted	0.12	1.00	1.00	0.32	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	197	3149	1372	506	2945			1520	1271		1520	1155
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	196	636	47	68	729	248	0	636	26	0	220	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	196	636	47	68	977	0	0	636	26	0	220	48
Confl. Peds. (#/hr)	43		37	37		43			26			60
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	5%	0%	6%	5%	8%	2%	3%	0%	4%	3%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	38.8	32.8	32.8	36.4	31.6			39.4	39.4		39.4	39.4
Effective Green, g (s)	38.8	32.8	32.8	36.4	31.6			39.4	39.4		39.4	39.4
Actuated g/C Ratio	0.43	0.36	0.36	0.40	0.35			0.44	0.44		0.44	0.44
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	173	1147	500	257	1034			665	556		665	505
v/s Ratio Prot	c0.08	0.20		0.01	0.33			c0.42			0.14	
v/s Ratio Perm	c0.41		0.03	0.09					0.02			0.04
v/c Ratio	1.13	0.55	0.09	0.26	0.94			0.96	0.05		0.33	0.10
Uniform Delay, d1	21.1	22.8	18.8	17.0	28.4			24.5	14.5		16.6	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	108.6	1.9	0.4	0.6	17.5			25.7	0.2		1.3	0.4
Delay (s)	129.8	24.7	19.2	17.6	45.9			50.2	14.7		18.0	15.2
Level of Service	F	C	B	B	D			D	B		B	B
Approach Delay (s)		47.8			44.0			48.8			17.5	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1001: Ashland Ave. □ W Irving Park Rd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	206	810	164	124	889	48	0	553	62	0	789	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.84	1.00	0.99			1.00	0.87		1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1580	3160	1172	1546	3133			1253	890		1550	1195
Flt Permitted	0.12	1.00	1.00	0.13	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	200	3160	1172	214	3133			1253	890		1550	1195
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Adj. Flow (vph)	217	853	173	131	936	51	0	582	65	0	831	141
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	217	853	173	131	987	0	0	582	65	0	831	141
Confl. Peds. (#/hr)	72		69	69		72			81			59
Confl. Bikes (#/hr)			5			7			7			6
Heavy Vehicles (%)	1%	1%	2%	3%	0%	4%	2%	0%	3%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								36	36		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	41.2	33.2	33.2	38.8	32.0			57.0	57.0		57.0	57.0
Effective Green, g (s)	41.2	33.2	33.2	38.8	32.0			57.0	57.0		57.0	57.0
Actuated g/C Ratio	0.37	0.30	0.30	0.35	0.29			0.52	0.52		0.52	0.52
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2			0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	175	953	353	157	911			649	461		803	619
v/s Ratio Prot	c0.09	0.27		0.05	0.32			0.46			c0.54	
v/s Ratio Perm	c0.37		0.15	0.24					0.07			0.12
v/c Ratio	1.24	0.90	0.49	0.83	1.08			0.90	0.14		1.03	0.23
Uniform Delay, d1	29.6	36.7	31.5	27.4	39.0			23.9	13.8		26.5	14.5
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.58	0.74		1.00	1.00
Incremental Delay, d2	147.0	10.6	0.4	28.9	55.0			11.5	0.4		41.1	0.9
Delay (s)	176.7	47.3	31.9	56.3	94.0			25.4	10.6		67.6	15.3
Level of Service	F	D	C	E	F			C	B		E	B
Approach Delay (s)		67.7			89.6			23.9			60.0	
Approach LOS		E			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	64.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1003: Ashland Ave. □ W Grace St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	32	76	30	0	0	0	0	639	32	0	751	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1509						1158			1203	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1509						1158			1203	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.97	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	34	80	32	0	0	0	0	673	34	0	791	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	146	0	0	0	0	0	707	0	0	813	0
Confl. Peds. (#/hr)	23		20			23			22			11
Confl. Bikes (#/hr)			1			1			1			3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	3%	2%	5%
Parking (#/hr)								44			38	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		22.0						80.0			80.0	
Effective Green, g (s)		22.0						80.0			80.0	
Actuated g/C Ratio		0.20						0.73			0.73	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		301						842			874	
v/s Ratio Prot								0.61			c0.68	
v/s Ratio Perm		0.10										
v/c Ratio		0.49						0.84			0.93	
Uniform Delay, d1		39.0						10.5			12.6	
Progression Factor		1.00						1.53			1.39	
Incremental Delay, d2		5.5						8.3			9.4	
Delay (s)		44.5						24.4			27.0	
Level of Service		D						C			C	
Approach Delay (s)		44.5			0.0			24.4			27.0	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	119	596	69	134	493	77	0	408	40	0	633	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.92		1.00	0.97		1.00	0.91
Flpb, ped/bikes	0.98	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1511	1573	1347	1568	1588	1312		1189	995		1250	999
Flt Permitted	0.27	1.00	1.00	0.18	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	436	1573	1347	292	1588	1312		1189	995		1250	999
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	125	627	73	141	519	81	0	429	42	0	666	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	125	627	73	141	519	81	0	429	42	0	666	49
Confl. Peds. (#/hr)	30		19	19		30			2			25
Confl. Bikes (#/hr)			2			7						
Heavy Vehicles (%)	0%	3%	0%	1%	2%	0%	8%	1%	0%	2%	3%	0%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0		53.0	53.0		53.0	53.0
Effective Green, g (s)	48.0	48.0	48.0	48.0	48.0	48.0		53.0	53.0		53.0	53.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44		0.48	0.48		0.48	0.48
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	190	686	587	127	692	572		572	479		602	481
v/s Ratio Prot		0.40			0.33			0.36			c0.53	
v/s Ratio Perm	0.29		0.05	c0.48		0.06			0.04			0.05
v/c Ratio	0.66	0.91	0.12	1.11	0.75	0.14		0.75	0.09		1.11	0.10
Uniform Delay, d1	24.5	29.1	18.5	31.0	26.0	18.6		23.1	15.4		28.5	15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.08		0.61	0.44
Incremental Delay, d2	8.0	16.7	0.1	112.5	4.6	0.1		7.6	0.3		58.0	0.2
Delay (s)	32.5	45.7	18.6	143.5	30.5	18.7		30.0	17.0		75.4	7.1
Level of Service	C	D	B	F	C	B		C	B		E	A
Approach Delay (s)		41.3			50.8			28.8			70.7	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	49.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1007: Ashland Ave. □ W Roscoe St.

8/8/2013

	↰	→	↳	↲	←	↱	↰	↑	↱	↳	↓	↲
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↑	↱
Volume (vph)	0	0	0	84	174	82	0	487	0	0	558	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	4.0
Lane Util. Factor					1.00			1.00			1.00	1.00
Frpb, ped/bikes					0.98			1.00			1.00	0.80
Flpb, ped/bikes					0.98			1.00			1.00	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1592			1499			1126	774
Flt Permitted					0.99			1.00			1.00	1.00
Satd. Flow (perm)					1592			1499			1126	774
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	88	183	86	0	513	0	0	587	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	357	0	0	513	0	0	587	48
Confl. Peds. (#/hr)			25	25		26			18			39
Confl. Bikes (#/hr)			1			1			6			5
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								6			48	48
Turn Type				Perm	NA			NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8								6
Actuated Green, G (s)					32.0			70.0			70.0	70.0
Effective Green, g (s)					32.0			70.0			70.0	70.0
Actuated g/C Ratio					0.29			0.64			0.64	0.64
Clearance Time (s)					4.0			4.0			4.0	4.0
Lane Grp Cap (vph)					463			953			716	492
v/s Ratio Prot								0.34			c0.52	
v/s Ratio Perm					0.22							0.06
v/c Ratio					0.77			0.54			0.82	0.10
Uniform Delay, d1					35.7			11.1			15.2	7.8
Progression Factor					1.00			0.96			0.57	0.82
Incremental Delay, d2					11.8			1.4			4.2	0.2
Delay (s)					47.4			12.0			12.9	6.5
Level of Service					D			B			B	A
Approach Delay (s)		0.0			47.4			12.0			12.4	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1009: Ashland Ave. □ W School St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	110	218	33	18	22	25	0	531	22	0	462	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.95			0.99			0.95	
Flpb, ped/bikes		0.97			0.98			1.00			1.00	
Frt		0.99			0.95			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1546			1469			1346			1432	
Flt Permitted		0.88			0.87			1.00			1.00	
Satd. Flow (perm)		1379			1303			1346			1432	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	116	229	35	19	23	26	0	559	23	0	486	55
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	380	0	0	68	0	0	582	0	0	541	0
Confl. Peds. (#/hr)	42		71	71		42			29			139
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	0%	1%	0%	1%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			62.0			62.0	
Effective Green, g (s)		40.0			40.0			62.0			62.0	
Actuated g/C Ratio		0.36			0.36			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		501			473			758			807	
v/s Ratio Prot								c0.43			0.38	
v/s Ratio Perm		c0.28			0.05							
v/c Ratio		0.76			0.14			0.77			0.67	
Uniform Delay, d1		30.8			23.5			18.5			16.8	
Progression Factor		1.00			1.00			0.44			0.67	
Incremental Delay, d2		10.3			0.6			3.2			2.5	
Delay (s)		41.1			24.1			11.3			13.8	
Level of Service		D			C			B			B	
Approach Delay (s)		41.1			24.1			11.3			13.8	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	→	↘	↘	↙	←	↖	↖	↑	↗	↓	↙	↙
Movement	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↱				↑	↰		↑	↱	↑	↱	
Volume (vph)	396	57	38	12	366	156	77	561	71	449	35	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	11	10	12	11	11	11	11	11
Total Lost time (s)	5.0				5.0	5.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00				1.00	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	0.98				1.00	0.81		1.00	0.73	1.00	0.89	
Flpb, ped/bikes	1.00				1.00	1.00		1.00	1.00	1.00	1.00	
Frt	0.97				1.00	0.85		1.00	0.85	1.00	0.85	
Flt Protected	1.00				1.00	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611				1719	1080		1331	829	1506	1313	
Flt Permitted	1.00				0.63	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (perm)	1611				1082	1080		1331	829	1506	1313	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	417	60	40	13	385	164	81	591	75	473	37	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	517	0	0	0	398	245	0	591	75	473	41	0
Confl. Peds. (#/hr)		44		44		76			95		63	
Confl. Bikes (#/hr)		5				13			11		6	
Heavy Vehicles (%)	3%	4%	0%	0%	1%	11%	1%	2%	0%	4%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								24	24	0		
Turn Type	NA			Perm	NA	Perm		NA	Perm	NA	Perm	
Protected Phases	10				14			2		6		
Permitted Phases				14		14			2		6	
Actuated Green, G (s)	32.0				32.0	32.0		40.0	40.0	40.0	40.0	
Effective Green, g (s)	32.0				32.0	32.0		40.0	40.0	40.0	40.0	
Actuated g/C Ratio	0.29				0.29	0.29		0.36	0.36	0.36	0.36	
Clearance Time (s)	5.0				5.0	5.0		6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	468				314	314		484	301	547	477	
v/s Ratio Prot	0.32							c0.44		0.31		
v/s Ratio Perm					c0.37	0.23			0.09		0.03	
v/c Ratio	1.10				1.27	0.78		1.22	0.25	0.86	0.09	
Uniform Delay, d1	39.0				39.0	35.8		35.0	24.5	32.5	23.0	
Progression Factor	1.00				1.00	1.00		0.76	0.81	0.83	0.96	
Incremental Delay, d2	73.2				143.2	17.3		111.4	1.3	13.0	0.3	
Delay (s)	112.2				182.2	53.1		137.9	21.1	40.0	22.3	
Level of Service	F				F	D		F	C	D	C	
Approach Delay (s)	112.2				133.0			124.7		38.6		
Approach LOS	F				F			F		D		

Intersection Summary			
HCM 2000 Control Delay	127.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL2	SEL	SET	SER	SER2	NWL2	NWL	NWT	NWR	NWR2
Lane Configurations										
Volume (vph)	4	53	271	93	12	7	31	279	97	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	11	11	11	12	9	11	11	11
Total Lost time (s)		6.0	6.0				6.0	6.0		
Lane Util. Factor		1.00	1.00				1.00	1.00		
Frpb, ped/bikes		1.00	1.00				1.00	1.00		
Flpb, ped/bikes		1.00	1.00				1.00	1.00		
Frt		1.00	0.96				1.00	0.96		
Flt Protected		0.95	1.00				0.95	1.00		
Satd. Flow (prot)		1511	1639				1539	1661		
Flt Permitted		0.19	1.00				0.19	1.00		
Satd. Flow (perm)		303	1639				309	1661		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	56	285	98	13	7	33	294	102	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	60	396	0	0	0	40	404	0	0
Confl. Peds. (#/hr)										
Confl. Bikes (#/hr)										
Heavy Vehicles (%)	0%	2%	2%	1%	0%	0%	0%	0%	0%	25%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Turn Type	Perm	Perm	NA			Perm	Perm	NA		
Protected Phases			4					8		
Permitted Phases	4	4				8	8			
Actuated Green, G (s)		21.0	21.0				21.0	21.0		
Effective Green, g (s)		21.0	21.0				21.0	21.0		
Actuated g/C Ratio		0.19	0.19				0.19	0.19		
Clearance Time (s)		6.0	6.0				6.0	6.0		
Lane Grp Cap (vph)		57	312				58	317		
v/s Ratio Prot			0.24					c0.24		
v/s Ratio Perm		0.20					0.13			
v/c Ratio		1.05	1.27				0.69	1.27		
Uniform Delay, d1		44.5	44.5				41.5	44.5		
Progression Factor		1.00	1.00				1.00	1.00		
Incremental Delay, d2		134.7	144.0				50.6	145.8		
Delay (s)		179.2	188.5				92.1	190.3		
Level of Service		F	F				F	F		
Approach Delay (s)			187.3					181.5		
Approach LOS			F					F		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1012: Ashland Ave. □ W Barry Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	129	306	32	0	651	0	0	732	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.98	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1907			1413			1238	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1907			1413			1238	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	136	322	34	0	685	0	0	771	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	492	0	0	685	0	0	820	0
Confl. Peds. (#/hr)			40	40		26			33			56
Confl. Bikes (#/hr)			2			2			2			3
Heavy Vehicles (%)	0%	0%	0%	3%	0%	3%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								16			30	30
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					29.0			73.0			73.0	
Effective Green, g (s)					29.0			73.0			73.0	
Actuated g/C Ratio					0.26			0.66			0.66	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					502			937			821	
v/s Ratio Prot								0.48			c0.66	
v/s Ratio Perm					0.26							
v/c Ratio					0.98			0.73			1.00	
Uniform Delay, d1					40.2			12.1			18.5	
Progression Factor					1.00			0.30			0.93	
Incremental Delay, d2					35.5			2.1			25.5	
Delay (s)					75.7			5.7			42.6	
Level of Service					E			A			D	
Approach Delay (s)		0.0			75.7			5.7			42.6	
Approach LOS		A			E			A			D	

Intersection Summary			
HCM 2000 Control Delay	38.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. □ W Wellington Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	120	229	107	0	0	0	0	657	68	0	696	75
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			0.99	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.97						0.99			0.99	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1666						1373			1401	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1666						1373			1401	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.96	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	126	241	113	0	0	0	0	692	72	0	733	79
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	480	0	0	0	0	0	764	0	0	812	0
Confl. Peds. (#/hr)	27		8			27			11			22
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	2%	2%	1%	0%	0%	43%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		34.0						68.0			68.0	
Effective Green, g (s)		34.0						68.0			68.0	
Actuated g/C Ratio		0.31						0.62			0.62	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		514						848			866	
v/s Ratio Prot								0.56			c0.58	
v/s Ratio Perm		0.29										
v/c Ratio		0.93						0.90			0.94	
Uniform Delay, d1		36.9						18.1			19.1	
Progression Factor		1.00						0.71			1.02	
Incremental Delay, d2		26.3						1.7			7.2	
Delay (s)		63.2						14.5			26.7	
Level of Service		E						B			C	
Approach Delay (s)		63.2			0.0			14.5			26.7	
Approach LOS		E			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1018: Ashland Ave. □ W Diversey Pkwy.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	168	533	55	170	639	83	0	735	70	0	1014	98
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00	0.90		1.00	0.91		1.00	0.79
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1580	1647	1228	1565	1647	1228		758	587		1385	1144
Flt Permitted	0.13	1.00	1.00	0.13	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	215	1647	1228	213	1647	1228		758	587		1385	1144
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	177	561	58	179	673	87	0	774	74	0	1067	103
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	177	561	58	179	673	87	0	774	74	0	1067	103
Confl. Peds. (#/hr)	29		30	30		29			17			52
Confl. Bikes (#/hr)			12			7			9			8
Heavy Vehicles (%)	1%	2%	0%	2%	2%	1%	0%	1%	0%	4%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								92	92		16	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	36.0	31.0	31.0	36.0	31.0	31.0		63.0	63.0		63.0	63.0
Effective Green, g (s)	36.0	31.0	31.0	36.0	31.0	31.0		63.0	63.0		63.0	63.0
Actuated g/C Ratio	0.33	0.28	0.28	0.33	0.28	0.28		0.57	0.57		0.57	0.57
Clearance Time (s)	3.0	4.0	4.0	3.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	132	464	346	131	464	346		434	336		793	655
v/s Ratio Prot	0.06	0.34		c0.06	c0.41			c1.02			0.77	
v/s Ratio Perm	0.38		0.05	0.39		0.07			0.13			0.09
v/c Ratio	1.34	1.21	0.17	1.37	1.45	0.25		1.78	0.22		1.35	0.16
Uniform Delay, d1	35.9	39.5	29.8	35.9	39.5	30.5		23.5	11.5		23.5	11.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.13	0.92
Incremental Delay, d2	195.5	112.8	1.0	205.9	214.5	1.7		361.7	1.5		162.0	0.4
Delay (s)	231.4	152.3	30.8	241.8	254.0	32.3		385.2	13.0		188.6	10.6
Level of Service	F	F	C	F	F	C		F	B		F	B
Approach Delay (s)		161.0			231.1			352.8			172.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	225.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1019: Ashland Ave. □ W Wrightwood Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	54	211	49	96	209	31	0	676	54	0	718	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.99			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1546			1565			1206			1486	
Flt Permitted		0.84			0.68			1.00			1.00	
Satd. Flow (perm)		1307			1075			1206			1486	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	222	52	101	220	33	0	712	57	0	756	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	331	0	0	354	0	0	769	0	0	802	0
Confl. Peds. (#/hr)	9		11	11		9			8			20
Confl. Bikes (#/hr)			3						1			2
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	6%	1%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			82.0			82.0	
Effective Green, g (s)		40.0			40.0			82.0			82.0	
Actuated g/C Ratio		0.31			0.31			0.63			0.63	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		402			330			760			937	
v/s Ratio Prot								c0.64			0.54	
v/s Ratio Perm		0.25			c0.33							
v/c Ratio		0.82			1.07			1.01			0.86	
Uniform Delay, d1		41.7			45.0			24.0			19.3	
Progression Factor		1.00			1.00			0.34			1.00	
Incremental Delay, d2		17.2			70.2			23.3			9.9	
Delay (s)		58.9			115.2			31.3			29.2	
Level of Service		E			F			C			C	
Approach Delay (s)		58.9			115.2			31.3			29.2	
Approach LOS		E			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1023: Ashland Ave. □ W Fullerton Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	148	648	16	96	524	28	0	730	75	0	679	170
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0		2.0	5.0	5.0		5.0	5.0		5.0	2.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93		1.00	0.93		1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1580	3144		1536	1631	1234		1516	1180		1520	1212
Flt Permitted	0.10	1.00		0.22	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	173	3144		350	1631	1234		1516	1180		1520	1212
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	156	682	17	101	552	29	0	768	79	0	715	179
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	156	699	0	101	552	29	0	768	79	0	715	179
Confl. Peds. (#/hr)	21		21	21		21			34			20
Confl. Bikes (#/hr)			9			2			6			
Heavy Vehicles (%)	1%	1%	0%	0%	3%	4%	0%	1%	1%	9%	3%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	pm+ov
Protected Phases	7	4		3	8			2 10			6	7
Permitted Phases	4			8		8			2 10			6
Actuated Green, G (s)	49.8	41.8		52.2	43.0	43.0		67.0	67.0		64.0	72.0
Effective Green, g (s)	49.8	41.8		52.2	43.0	43.0		65.0	65.0		64.0	72.0
Actuated g/C Ratio	0.38	0.32		0.40	0.33	0.33		0.50	0.50		0.49	0.55
Clearance Time (s)	2.0	5.0		2.0	5.0	5.0					5.0	2.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	152	1010		224	539	408		758	590		748	671
v/s Ratio Prot	c0.06	0.22		c0.03	c0.34			c0.51			0.47	0.02
v/s Ratio Perm	0.33			0.15		0.02			0.07			0.13
v/c Ratio	1.03	0.69		0.45	1.02	0.07		1.01	0.13		0.96	0.27
Uniform Delay, d1	34.0	38.5		26.6	43.5	29.8		32.5	17.4		31.6	15.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.47	0.57		1.15	1.19
Incremental Delay, d2	80.1	3.9		1.4	45.0	0.3		13.3	0.0		16.4	0.1
Delay (s)	114.1	42.4		28.0	88.5	30.1		28.6	9.9		52.8	18.2
Level of Service	F	D		C	F	C		C	A		D	B
Approach Delay (s)		55.5			77.1			26.9			45.9	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	49.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	→	↘	↙	←	↖	↑	↗	↓	↙	↙	↗
Movement	EBT	EBR	WBL2	WBT	WBR	NBT	NBR	SBT	SBR	SBR2	NEL
Lane Configurations	↑	↱		↰↱		↱		↱			⑂
Volume (vph)	509	209	28	560	157	739	32	687	20	7	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	16
Total Lost time (s)	5.0	5.0		5.0		5.0		5.0			
Lane Util. Factor	1.00	1.00		0.95		1.00		1.00			
Frpb, ped/bikes	1.00	0.93		0.99		1.00		1.00			
Flpb, ped/bikes	1.00	1.00		1.00		1.00		1.00			
Frt	1.00	0.85		0.97		0.99		0.99			
Flt Protected	1.00	1.00		1.00		1.00		1.00			
Satd. Flow (prot)	1740	1371		3134		1540		1449			
Flt Permitted	1.00	1.00		0.84		1.00		1.00			
Satd. Flow (perm)	1740	1371		2651		1540		1449			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92
Adj. Flow (vph)	536	220	29	589	165	778	34	723	21	7	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	536	220	0	783	0	812	0	751	0	0	0
Confl. Peds. (#/hr)		34			11						
Heavy Vehicles (%)	0%	0%	0%	1%	2%	1%	3%	4%	0%	14%	2%
Parking (#/hr)						0		6			
Turn Type	NA	Perm	Perm	NA		NA		NA			
Protected Phases	4			8		2		6			10
Permitted Phases		4	8								
Actuated Green, G (s)	56.0	56.0		56.0		64.0		64.0			
Effective Green, g (s)	56.0	56.0		56.0		64.0		64.0			
Actuated g/C Ratio	0.43	0.43		0.43		0.49		0.49			
Clearance Time (s)	5.0	5.0		5.0		5.0		5.0			
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0			
Lane Grp Cap (vph)	749	590		1141		758		713			
v/s Ratio Prot	c0.31					c0.53		0.52			
v/s Ratio Perm		0.16		0.30							
v/c Ratio	0.72	0.37		0.69		1.07		1.05			
Uniform Delay, d1	30.4	25.1		29.9		33.0		33.0			
Progression Factor	1.00	1.00		1.00		1.11		0.52			
Incremental Delay, d2	5.8	1.8		3.4		35.0		37.9			
Delay (s)	36.2	26.9		33.3		71.7		55.1			
Level of Service	D	C		C		E		E			
Approach Delay (s)	33.5			33.3		71.7		55.1			0.0
Approach LOS	C			C		E		E			A

Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	120.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1025: Ashland Ave. □ W Webster Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↱			↱			↱	
Volume (vph)	104	216	9	220	360	22	0	786	133	0	728	86
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		0.95			1.00			1.00	
Frpb, ped/bikes		1.00	0.97		1.00			0.99			1.00	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		0.99			0.98			0.99	
Flt Protected		0.98	1.00		0.98			1.00			1.00	
Satd. Flow (prot)		1651	1384		3092			1513			1471	
Flt Permitted		0.48	1.00		0.61			1.00			1.00	
Satd. Flow (perm)		814	1384		1932			1513			1471	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	109	227	9	232	379	23	0	827	140	0	766	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	336	9	0	634	0	0	967	0	0	857	0
Confl. Peds. (#/hr)	4		4	4		4			6			6
Heavy Vehicles (%)	0%	0%	0%	1%	0%	5%	0%	1%	0%	10%	5%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		47.0	47.0		47.0			75.0			75.0	
Effective Green, g (s)		47.0	47.0		47.0			75.0			75.0	
Actuated g/C Ratio		0.36	0.36		0.36			0.58			0.58	
Clearance Time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Grp Cap (vph)		294	500		698			872			848	
v/s Ratio Prot								c0.64			0.58	
v/s Ratio Perm		c0.41	0.01		0.33							
v/c Ratio		1.14	0.02		1.02dl			1.11			1.01	
Uniform Delay, d1		41.5	26.7		39.5			27.5			27.5	
Progression Factor		1.00	1.00		1.00			1.01			0.53	
Incremental Delay, d2		96.8	0.1		17.8			63.2			23.0	
Delay (s)		138.3	26.7		57.3			90.9			37.6	
Level of Service		F	C		E			F			D	
Approach Delay (s)		135.4			57.3			90.9			37.6	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	72.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1026: Ashland Ave. □ N Elston Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↑	↱		↱			↱	
Volume (vph)	20	319	70	0	518	218	0	545	1	0	695	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	3.0		4.0			3.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.97		1.00			1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1596	1647	1336		2020	1480		1550			1515	
Flt Permitted	0.10	1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)	166	1647	1336		2020	1480		1550			1515	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	21	336	74	0	545	229	0	574	1	0	732	19
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	336	74	0	545	229	0	575	0	0	751	0
Confl. Peds. (#/hr)	8		9	9		8			3			1
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	1%	0%	5%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm		NA	custom		NA			NA	
Protected Phases		4			8	1		2			6	
Permitted Phases	4		4			8						
Actuated Green, G (s)	43.0	43.0	43.0		43.0	50.0		69.0			80.0	
Effective Green, g (s)	43.0	43.0	43.0		43.0	50.0		69.0			80.0	
Actuated g/C Ratio	0.33	0.33	0.33		0.33	0.38		0.53			0.62	
Clearance Time (s)	4.0	4.0	4.0		4.0	3.0		4.0			3.0	
Lane Grp Cap (vph)	54	544	441		668	569		822			932	
v/s Ratio Prot		0.20			c0.27	0.02		0.37			c0.50	
v/s Ratio Perm	0.13		0.06			0.13						
v/c Ratio	0.39	0.62	0.17		0.82	0.40		0.70			0.81	
Uniform Delay, d1	33.4	36.6	30.8		39.9	29.1		22.8			19.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00		0.54			0.55	
Incremental Delay, d2	19.8	5.2	0.8		10.6	2.1		2.3			2.1	
Delay (s)	53.2	41.8	31.6		50.5	31.2		14.6			12.7	
Level of Service	D	D	C		D	C		B			B	
Approach Delay (s)		40.6			44.8			14.6			12.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1027: Ashland Ave. □ W Armitage Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰		↰	↱			↑	↱
Volume (vph)	448	287	29	5	412	0	165	271	21	0	572	229
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	0.96
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99			1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1637	1608			1980		1637	1467			1689	1238
Flt Permitted	0.14	1.00			1.00		0.11	1.00			1.00	1.00
Satd. Flow (perm)	237	1608			1972		182	1467			1689	1238
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	472	302	31	5	434	0	174	285	22	0	602	241
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	472	333	0	0	439	0	174	307	0	0	602	241
Confl. Peds. (#/hr)	6		5	5		6	15		12			15
Heavy Vehicles (%)	1%	3%	0%	0%	3%	0%	1%	4%	5%	11%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)								0				0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA			NA	pm+ov
Protected Phases	7	4			8		5	2			6	7
Permitted Phases	4			8			2					6
Actuated Green, G (s)	61.4	61.4			30.4		59.6	59.6			49.0	77.0
Effective Green, g (s)	61.4	61.4			30.4		59.6	59.6			49.0	77.0
Actuated g/C Ratio	0.47	0.47			0.23		0.46	0.46			0.38	0.59
Clearance Time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	413	759			461		179	672			636	733
v/s Ratio Prot	c0.25	0.21					c0.06	0.21			c0.36	0.07
v/s Ratio Perm	c0.29				0.22		0.38					0.12
v/c Ratio	1.14	0.44			0.95		0.97	0.46			0.95	0.33
Uniform Delay, d1	38.5	22.8			49.1		28.8	24.1			39.2	13.4
Progression Factor	1.00	1.00			1.00		1.70	1.01			0.91	0.60
Incremental Delay, d2	89.4	0.4			29.9		32.0	0.8			19.1	0.2
Delay (s)	127.8	23.2			79.0		81.1	25.1			54.9	8.2
Level of Service	F	C			E		F	C			D	A
Approach Delay (s)		84.6			79.0			45.4			41.5	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	62.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	105.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↑↱			↑↱	
Volume (vph)	2	185	16	113	265	9	0	489	107	0	573	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	0.95		1.00			0.92			0.98	
Flpb, ped/bikes		1.00	1.00		0.99			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.98	
Flt Protected		1.00	1.00		0.99			1.00			1.00	
Satd. Flow (prot)		1713	1451		1692			888			1463	
Flt Permitted		1.00	1.00		0.72			1.00			1.00	
Satd. Flow (perm)		1709	1451		1230			888			1463	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	2	195	17	119	279	9	0	515	113	0	603	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	197	17	0	407	0	0	628	0	0	708	0
Confl. Peds. (#/hr)	62		8	8		62			125			24
Heavy Vehicles (%)	0%	5%	0%	5%	3%	0%	0%	2%	0%	50%	3%	5%
Parking (#/hr)								64			0	
Turn Type	Perm	NA	Perm	pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		42.0	42.0		42.0			79.0			79.0	
Effective Green, g (s)		42.0	42.0		42.0			79.0			79.0	
Actuated g/C Ratio		0.32	0.32		0.32			0.61			0.61	
Clearance Time (s)		5.0	5.0		5.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		552	468		397			539			889	
v/s Ratio Prot								c0.71			0.48	
v/s Ratio Perm		0.12	0.01		c0.33							
v/c Ratio		0.36	0.04		1.03			1.17			0.80	
Uniform Delay, d1		33.7	30.1		44.0			25.5			19.4	
Progression Factor		1.00	1.00		1.00			1.18			0.52	
Incremental Delay, d2		1.8	0.1		51.8			90.7			5.1	
Delay (s)		35.5	30.3		95.8			120.9			15.1	
Level of Service		D	C		F			F			B	
Approach Delay (s)		35.1			95.8			120.9			15.1	
Approach LOS		D			F			F			B	

Intersection Summary			
HCM 2000 Control Delay	68.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1030: Ashland Ave. □ W Wabansia Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	4	74	9	4	26	0	551	3	0	675	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			0.97			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.91			0.91			1.00			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1414			1456			1300			1473	
Flt Permitted		0.90			0.95			1.00			1.00	
Satd. Flow (perm)		1297			1396			1300			1473	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	34	4	78	9	4	27	0	580	3	0	711	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	40	0	0	583	0	0	719	0
Confl. Peds. (#/hr)	6		15	15		6						8
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	8%	3%	0%	0%	6%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			104.0			104.0	
Effective Green, g (s)		18.0			18.0			104.0			104.0	
Actuated g/C Ratio		0.14			0.14			0.80			0.80	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		179			193			1040			1178	
v/s Ratio Prot								0.45			c0.49	
v/s Ratio Perm		c0.09			0.03							
v/c Ratio		0.65			0.21			0.56			0.61	
Uniform Delay, d1		53.0			49.7			4.7			5.1	
Progression Factor		1.00			1.00			0.52			0.57	
Incremental Delay, d2		10.6			1.1			1.3			1.3	
Delay (s)		63.6			50.8			3.8			4.2	
Level of Service		E			D			A			A	
Approach Delay (s)		63.6			50.8			3.8			4.2	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1033: Ashland Ave. □ W North Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	101	584	57	140	558	34	0	594	143	0	718	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.94		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1480	2714		1520	2985			1250	985		1177	886
Flt Permitted	0.17	1.00		0.14	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	270	2714		217	2985			1250	985		1177	886
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	106	615	60	147	587	36	0	625	151	0	756	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	106	675	0	147	623	0	0	625	151	0	756	31
Confl. Peds. (#/hr)			48	48					21			20
Heavy Vehicles (%)	4%	11%	4%	1%	2%	6%	2%	3%	3%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	38.0	31.0		38.0	31.0			81.0	81.0		81.0	81.0
Effective Green, g (s)	38.0	31.0		38.0	31.0			81.0	81.0		81.0	81.0
Actuated g/C Ratio	0.29	0.24		0.29	0.24			0.62	0.62		0.62	0.62
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	647		133	711			778	613		733	552
v/s Ratio Prot	0.04	0.25		c0.06	0.21			0.50			c0.64	
v/s Ratio Perm	0.18			c0.26					0.15			0.03
v/c Ratio	0.74	1.04		1.11	0.88			0.80	0.25		1.03	0.06
Uniform Delay, d1	36.8	49.5		41.7	47.7			18.5	10.9		24.5	9.6
Progression Factor	1.00	1.00		1.00	1.00			0.85	0.82		0.46	0.53
Incremental Delay, d2	17.7	47.2		109.1	14.3			7.4	0.8		38.8	0.2
Delay (s)	54.4	96.7		150.8	61.9			23.1	9.8		50.1	5.3
Level of Service	D	F		F	E			C	A		D	A
Approach Delay (s)		90.9			78.9			20.5			48.4	
Approach LOS		F			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	59.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	57	40	5	39	24	66	0	593	26	0	788	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	11	11	11	11	11	11
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.96			1.00			1.00	
Flpb, ped/bikes		0.98			0.97			1.00			1.00	
Frt		0.99			0.93			0.99			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1860			1456			1146			1438	
Flt Permitted		0.72			0.90			1.00			1.00	
Satd. Flow (perm)		1381			1324			1146			1438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	42	5	41	25	69	0	624	27	0	829	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	107	0	0	135	0	0	651	0	0	846	0
Confl. Peds. (#/hr)	18		38	38		18			5			47
Heavy Vehicles (%)	4%	0%	20%	5%	0%	2%	4%	1%	0%	1%	1%	0%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			100.0			100.0	
Effective Green, g (s)		24.0			24.0			100.0			100.0	
Actuated g/C Ratio		0.18			0.18			0.77			0.77	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		254			244			881			1106	
v/s Ratio Prot								0.57			c0.59	
v/s Ratio Perm		0.08			c0.10							
v/c Ratio		0.42			0.55			0.74			0.76	
Uniform Delay, d1		46.9			48.1			8.0			8.4	
Progression Factor		1.00			1.00			0.74			0.34	
Incremental Delay, d2		5.1			8.8			5.4			1.9	
Delay (s)		51.9			56.9			11.3			4.8	
Level of Service		D			E			B			A	
Approach Delay (s)		51.9			56.9			11.3			4.8	
Approach LOS		D			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↑	↱		↱			↱	
Volume (vph)	33	236	73	0	340	77	0	363	2	0	804	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	11	11	8	11	11	11
Total Lost time (s)	5.0	5.0			5.0	3.0		5.0			5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.90		1.00			1.00	
Flpb, ped/bikes	0.95	1.00			1.00	1.00		1.00			1.00	
Frt	1.00	0.96			1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1435	1592			1706	1312		1705			1535	
Flt Permitted	0.32	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)	488	1592			1706	1312		1705			1535	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.95	0.95	0.90	0.95	0.95	0.90	0.95	0.95
Adj. Flow (vph)	35	248	77	0	358	81	0	382	2	0	846	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	325	0	0	358	81	0	384	0	0	848	0
Confl. Peds. (#/hr)	49		18			49						5
Heavy Vehicles (%)	6%	5%	3%	0%	2%	1%	8%	2%	0%	5%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4					3 8						
Actuated Green, G (s)	32.0	32.0			37.0	37.0		83.0			83.0	
Effective Green, g (s)	32.0	32.0			37.0	37.0		83.0			83.0	
Actuated g/C Ratio	0.25	0.25			0.28	0.28		0.64			0.64	
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)	120	391			485	373		1088			980	
v/s Ratio Prot		c0.20			c0.21			0.23			c0.55	
v/s Ratio Perm	0.07					0.06						
v/c Ratio	0.29	0.83			0.74	0.22		0.35			0.87	
Uniform Delay, d1	39.8	46.4			42.1	35.5		11.0			19.0	
Progression Factor	1.00	1.00			1.00	1.00		0.38			0.73	
Incremental Delay, d2	6.1	18.3			9.7	1.3		0.7			8.7	
Delay (s)	45.9	64.7			51.8	36.8		4.9			22.5	
Level of Service	D	E			D	D		A			C	
Approach Delay (s)		62.9			49.0			4.9			22.5	
Approach LOS		E			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	104	461	29	251	716	15	0	408	144	0	680	183
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.66	1.00	1.00	0.56		1.00	0.68		1.00	0.67
Flpb, ped/bikes	0.86	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1421	3179	978	1577	3160	806		1464	1007		1550	866
Flt Permitted	0.34	1.00	1.00	0.33	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	508	3179	978	544	3160	806		1464	1007		1550	866
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.93	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	109	485	31	264	754	16	0	429	152	0	716	193
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	109	485	31	264	754	16	0	429	152	0	716	193
Confl. Peds. (#/hr)	169		130	130		169			244			272
Confl. Bikes (#/hr)						3						5
Heavy Vehicles (%)	0%	4%	0%	1%	1%	0%	7%	1%	0%	0%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.0	39.0	39.0	53.0	53.0	53.0		67.0	67.0		67.0	67.0
Effective Green, g (s)	39.0	39.0	39.0	53.0	53.0	53.0		67.0	67.0		67.0	67.0
Actuated g/C Ratio	0.30	0.30	0.30	0.41	0.41	0.41		0.52	0.52		0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	152	953	293	309	1288	328		754	518		798	446
v/s Ratio Prot		0.15		c0.07	0.24			0.29			c0.46	
v/s Ratio Perm	0.21		0.03	c0.28		0.02			0.15			0.22
v/c Ratio	0.72	0.51	0.11	0.85	0.59	0.05		0.57	0.29		0.90	0.43
Uniform Delay, d1	40.6	37.6	32.9	32.3	30.0	23.3		21.6	18.0		28.4	19.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.10	1.14		0.49	0.44
Incremental Delay, d2	25.1	1.9	0.7	24.8	2.0	0.3		2.1	1.0		8.0	1.5
Delay (s)	65.7	39.5	33.6	57.1	31.9	23.5		25.9	21.5		21.8	10.0
Level of Service	E	D	C	E	C	C		C	C		C	B
Approach Delay (s)		43.8			38.2			24.8			19.3	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1049: Ashland Ave. □ W Augusta Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	120	325	58	94	523	62	0	463	130	0	743	181
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94		0.96			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1565	1723	1426	1500	1663	1288		1272			1217	
Flt Permitted	0.14	1.00	1.00	0.37	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	233	1723	1426	580	1663	1288		1272			1217	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	126	342	61	99	551	65	0	487	137	0	782	191
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	126	342	61	99	551	65	0	624	0	0	973	0
Confl. Peds. (#/hr)	14		5	5		14			37			6
Heavy Vehicles (%)	2%	1%	0%	2%	1%	0%	0%	2%	1%	2%	4%	1%
Parking (#/hr)								20			30	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0		76.0			76.0	
Effective Green, g (s)	48.0	48.0	48.0	48.0	48.0	48.0		76.0			76.0	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37		0.58			0.58	
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	86	636	526	214	614	475		743			711	
v/s Ratio Prot		0.20			0.33			0.49			c0.80	
v/s Ratio Perm	c0.54		0.04	0.17		0.05						
v/c Ratio	1.47	0.54	0.12	0.46	0.90	0.14		0.84			1.37	
Uniform Delay, d1	41.0	32.3	27.0	31.2	38.7	27.2		22.0			27.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			0.72	
Incremental Delay, d2	262.0	0.9	0.1	1.6	15.8	0.1		11.0			171.3	
Delay (s)	303.0	33.1	27.1	32.8	54.4	27.4		33.1			190.7	
Level of Service	F	C	C	C	D	C		C			F	
Approach Delay (s)		96.7			49.0			33.1			190.7	
Approach LOS		F			D			C			F	

Intersection Summary			
HCM 2000 Control Delay	102.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1056: Ashland Ave. □ W Chicago Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	103	548	72	38	691	33	0	508	111	0	496	217
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.86		1.00	0.95
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1643	3215		1614	3246			1430	1279		1550	1404
Flt Permitted	0.20	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	353	3215		455	3246			1430	1279		1550	1404
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	108	577	76	40	727	35	0	535	117	0	522	228
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	108	653	0	40	762	0	0	535	117	0	522	228
Confl. Peds. (#/hr)	16		50	50		16			121			38
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	1%	1%	0%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	30.1	30.1		30.1	30.1			51.9	51.9		51.9	51.9
Effective Green, g (s)	30.1	30.1		30.1	30.1			51.9	51.9		51.9	51.9
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.58	0.58		0.58	0.58
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	118	1075		152	1085			824	737		893	809
v/s Ratio Prot		0.20			0.23			c0.37			0.34	
v/s Ratio Perm	c0.31			0.09					0.09			0.16
v/c Ratio	0.92	0.61		0.26	0.70			0.65	0.16		0.58	0.28
Uniform Delay, d1	28.7	25.0		21.9	26.1			12.9	8.9		12.2	9.6
Progression Factor	1.00	1.00		1.00	1.00			0.65	0.68		1.00	1.00
Incremental Delay, d2	56.7	1.0		0.9	2.1			3.2	0.4		2.8	0.9
Delay (s)	85.4	26.0		22.8	28.1			11.5	6.4		15.0	10.5
Level of Service	F	C		C	C			B	A		B	B
Approach Delay (s)		34.4			27.9			10.6			13.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1062: Ashland Ave. □ W Erie St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	53	28	25	15	55	23	0	652	7	0	649	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.97			0.97			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1524			1570			1462			1407	
Flt Permitted		0.83			0.95			1.00			1.00	
Satd. Flow (perm)		1302			1497			1462			1407	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	56	29	26	16	58	24	0	686	7	0	683	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	98	0	0	693	0	0	704	0
Confl. Peds. (#/hr)	8		16	16		8			11			8
Heavy Vehicles (%)	0%	7%	0%	7%	0%	0%	0%	1%	0%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			64.0			64.0	
Effective Green, g (s)		18.0			18.0			64.0			64.0	
Actuated g/C Ratio		0.20			0.20			0.71			0.71	
Clearance Time (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		260			299			1039			1000	
v/s Ratio Prot								0.47			c0.50	
v/s Ratio Perm		c0.09			0.07							
v/c Ratio		0.43			0.33			0.67			0.70	
Uniform Delay, d1		31.5			30.8			7.1			7.5	
Progression Factor		1.00			1.00			0.60			1.18	
Incremental Delay, d2		5.1			2.9			2.3			3.9	
Delay (s)		36.5			33.7			6.6			12.8	
Level of Service		D			C			A			B	
Approach Delay (s)		36.5			33.7			6.6			12.8	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1066: Ashland Ave. □ W Grand Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	156	584	92	82	676	104	0	531	50	0	498	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.95		1.00	0.89
Flpb, ped/bikes	1.00	1.00		0.96	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1564	2998		1526	3042			1430	1401		1535	1169
Flt Permitted	0.18	1.00		0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	289	2998		401	3042			1430	1401		1535	1169
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	164	615	97	86	712	109	0	559	53	0	524	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	164	712	0	86	821	0	0	559	53	0	524	75
Confl. Peds. (#/hr)	5		69	69		5			23			56
Heavy Vehicles (%)	2%	2%	1%	0%	3%	0%	10%	1%	0%	3%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	39.0	38.0		28.0	28.0			44.0	44.0		44.0	44.0
Effective Green, g (s)	39.0	38.0		28.0	28.0			44.0	44.0		44.0	44.0
Actuated g/C Ratio	0.43	0.42		0.31	0.31			0.49	0.49		0.49	0.49
Clearance Time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	224	1265		124	946			699	684		750	571
v/s Ratio Prot	c0.06	0.24			c0.27			c0.39			0.34	
v/s Ratio Perm	0.26			0.21					0.04			0.06
v/c Ratio	0.73	0.56		0.69	0.87			0.80	0.08		0.70	0.13
Uniform Delay, d1	31.3	19.7		27.2	29.3			19.3	12.2		17.9	12.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.99	1.10
Incremental Delay, d2	11.7	1.8		27.4	10.6			9.3	0.2		4.0	0.4
Delay (s)	42.9	21.5		54.6	39.9			28.6	12.4		21.8	14.2
Level of Service	D	C		D	D			C	B		C	B
Approach Delay (s)		25.5			41.3			27.2			20.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. □ W Fulton St. (West)

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↱	
Volume (vph)	53	55	0	464	742	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.97			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.93			1.00	0.99	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1458			1535	1489	
Flt Permitted	0.98			1.00	1.00	
Satd. Flow (perm)	1458			1535	1489	
Peak-hour factor, PHF	0.95	0.95	0.97	0.95	0.95	0.95
Adj. Flow (vph)	56	58	0	488	781	89
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	114	0	0	488	870	0
Confl. Peds. (#/hr)	18	3				
Heavy Vehicles (%)	2%	9%	21%	2%	4%	1%
Parking (#/hr)				0	0	
Turn Type	NA			NA	NA	
Protected Phases	4			2 10	6	
Permitted Phases						
Actuated Green, G (s)	16.0			88.0	80.0	
Effective Green, g (s)	16.0			88.0	80.0	
Actuated g/C Ratio	0.15			0.80	0.73	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	212			1228	1082	
v/s Ratio Prot	c0.08			c0.32	c0.58	
v/s Ratio Perm						
v/c Ratio	0.54			0.40	0.80	
Uniform Delay, d1	43.6			3.2	9.9	
Progression Factor	1.00			0.44	1.00	
Incremental Delay, d2	9.4			0.8	6.4	
Delay (s)	53.0			2.2	16.2	
Level of Service	D			A	B	
Approach Delay (s)	53.0			2.2	16.2	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1074: Ashland Ave. □ W Fulton St. (East)

8/8/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↑
Volume (vph)	36	61	464	79	0	758
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	11	11	11	11
Total Lost time (s)	3.0		3.0			3.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.87		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		0.98			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1226		1507			1439
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	1226		1507			1439
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.99	0.95
Adj. Flow (vph)	38	64	488	83	0	798
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	102	0	571	0	0	798
Confl. Peds. (#/hr)	3	18				
Heavy Vehicles (%)	6%	7%	2%	1%	0%	4%
Parking (#/hr)			0			8
Turn Type	NA		NA			NA
Protected Phases	8		2			6 14
Permitted Phases						
Actuated Green, G (s)	16.0		80.0			88.0
Effective Green, g (s)	16.0		80.0			88.0
Actuated g/C Ratio	0.15		0.73			0.80
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	178		1096			1151
v/s Ratio Prot	c0.08		0.38			c0.55
v/s Ratio Perm						
v/c Ratio	0.57		0.52			0.69
Uniform Delay, d1	43.8		6.6			4.9
Progression Factor	1.00		0.67			0.17
Incremental Delay, d2	12.7		1.2			2.1
Delay (s)	56.5		5.6			2.9
Level of Service	E		A			A
Approach Delay (s)	56.5		5.6			2.9
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↑	↱
Volume (vph)	34	274	31	32	307	89	0	491	25	0	586	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.98			0.99			1.00	0.62
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.99			1.00	0.85
Flt Protected		0.99			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1721			1686			1221			1689	819
Flt Permitted		0.92			0.96			1.00			1.00	1.00
Satd. Flow (perm)		1584			1617			1221			1689	819
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.93	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	36	288	33	34	323	94	0	517	26	0	617	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	357	0	0	451	0	0	543	0	0	617	32
Confl. Peds. (#/hr)	27		52	52		27			45			88
Confl. Bikes (#/hr)			2						2			
Heavy Vehicles (%)	3%	1%	0%	0%	1%	2%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA			NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8								6
Actuated Green, G (s)		40.0			40.0			62.0			62.0	62.0
Effective Green, g (s)		40.0			40.0			62.0			62.0	62.0
Actuated g/C Ratio		0.36			0.36			0.56			0.56	0.56
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		576			588			688			951	461
v/s Ratio Prot								c0.44			0.37	
v/s Ratio Perm		0.23			c0.28							0.04
v/c Ratio		0.62			0.77			0.79			0.65	0.07
Uniform Delay, d1		28.8			30.9			18.9			16.5	10.9
Progression Factor		1.00			1.00			0.36			0.62	0.56
Incremental Delay, d2		5.0			9.3			8.7			2.5	0.2
Delay (s)		33.7			40.1			15.5			12.6	6.3
Level of Service		C			D			B			B	A
Approach Delay (s)		33.7			40.1			15.5			12.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑↑			↑↱	
Volume (vph)	0	0	0	20	251	21	0	583	0	0	662	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00		0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00			0.99	
Flpb, ped/bikes				0.99	1.00	1.00		1.00			1.00	
Frt				1.00	1.00	0.85		1.00			0.98	
Flt Protected				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)				1585	3160	1401		3079			2759	
Flt Permitted				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (perm)				1585	3160	1401		3079			2759	
Peak-hour factor, PHF	0.91	0.97	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	0	0	0	21	264	22	0	614	0	0	697	104
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	21	264	22	0	614	0	0	801	0
Confl. Peds. (#/hr)			5	5		5			27			44
Confl. Bikes (#/hr)			2						1			1
Heavy Vehicles (%)	9%	0%	0%	0%	1%	0%	3%	2%	0%	0%	3%	0%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				31.0	31.0	31.0		71.0			71.0	
Effective Green, g (s)				31.0	31.0	31.0		71.0			71.0	
Actuated g/C Ratio				0.28	0.28	0.28		0.65			0.65	
Clearance Time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)				446	890	394		1987			1780	
v/s Ratio Prot					c0.08			0.20			c0.29	
v/s Ratio Perm				0.01		0.02						
v/c Ratio				0.05	0.30	0.06		0.31			0.45	
Uniform Delay, d1				28.7	31.0	28.8		8.6			9.7	
Progression Factor				1.00	1.00	1.00		0.21			0.82	
Incremental Delay, d2				0.2	0.9	0.3		0.4			0.7	
Delay (s)				28.9	31.8	29.1		2.2			8.7	
Level of Service				C	C	C		A			A	
Approach Delay (s)		0.0			31.4			2.2			8.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1080: Ashland Ave. □ W Warren Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↱			↑↑	
Volume (vph)	46	338	71	0	0	0	0	570	36	0	562	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						0.95			0.95	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.99			1.00	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		2953						2741			2614	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		2953						2741			2614	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.96	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	48	356	75	0	0	0	0	600	38	0	592	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	479	0	0	0	0	0	638	0	0	592	0
Confl. Peds. (#/hr)			2						19			30
Confl. Bikes (#/hr)									3			3
Heavy Vehicles (%)	0%	1%	2%	0%	0%	0%	0%	2%	0%	3%	3%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		43.0						59.0			59.0	
Effective Green, g (s)		43.0						59.0			59.0	
Actuated g/C Ratio		0.39						0.54			0.54	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1154						1470			1402	
v/s Ratio Prot								c0.23			0.23	
v/s Ratio Perm		0.16										
v/c Ratio		0.42						0.43			0.42	
Uniform Delay, d1		24.4						15.4			15.3	
Progression Factor		1.00						0.58			0.87	
Incremental Delay, d2		1.1						0.8			0.9	
Delay (s)		25.5						9.7			14.2	
Level of Service		C						A			B	
Approach Delay (s)		25.5			0.0			9.7			14.2	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1082: Ashland Ave. □ W Madison St.

8/8/2013

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	44	614	84	14	828	208	0	485	4	0	591	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.97	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.97			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1587	2957		1548	2963			3105			3005	
Flt Permitted	0.17	1.00		0.30	1.00			1.00			1.00	
Satd. Flow (perm)	278	2957		493	2963			3105			3005	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	46	646	88	15	872	219	0	511	4	0	622	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	46	734	0	15	1091	0	0	515	0	0	668	0
Confl. Peds. (#/hr)	31		74	74		31			23			27
Confl. Bikes (#/hr)						3			1			2
Heavy Vehicles (%)	0%	5%	0%	0%	4%	0%	17%	1%	0%	5%	3%	2%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8								
Actuated Green, G (s)	52.0	52.0		63.0	61.0			41.0			41.0	
Effective Green, g (s)	52.0	52.0		63.0	61.0			41.0			41.0	
Actuated g/C Ratio	0.47	0.47		0.57	0.55			0.37			0.37	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	131	1397		282	1643			1157			1120	
v/s Ratio Prot		0.25			c0.37			0.17			c0.22	
v/s Ratio Perm	0.17			0.03								
v/c Ratio	0.35	0.53		0.05	0.66			0.45			0.60	
Uniform Delay, d1	18.3	20.3		10.4	17.3			25.9			27.8	
Progression Factor	1.00	1.00		1.00	1.00			0.64			0.69	
Incremental Delay, d2	7.3	1.4		0.4	2.1			1.0			2.2	
Delay (s)	25.6	21.8		10.7	19.4			17.6			21.4	
Level of Service	C	C		B	B			B			C	
Approach Delay (s)		22.0			19.3			17.6			21.4	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1083: Ashland Ave. □ W Ogden Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	172	742	0	204	640	0	0	367	168	0	396	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1708	3353		1636	3241			3076			2936	
Flt Permitted	0.36	1.00		0.29	1.00			1.00			1.00	
Satd. Flow (perm)	638	3353		495	3241			3076			2936	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	181	781	0	215	674	0	0	386	177	0	417	80
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	181	781	0	215	674	0	0	563	0	0	497	0
Confl. Peds. (#/hr)	3		7	7		3			13			22
Confl. Bikes (#/hr)			1			3			3			5
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	0%	2%	0%	0%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	3	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	57.0	57.0		71.0	70.0			32.0			32.0	
Effective Green, g (s)	57.0	57.0		71.0	70.0			32.0			32.0	
Actuated g/C Ratio	0.52	0.52		0.65	0.64			0.29			0.29	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	330	1737		423	2062			894			854	
v/s Ratio Prot		0.23		c0.05	0.21			c0.18			0.17	
v/s Ratio Perm	c0.28			0.28								
v/c Ratio	0.55	0.45		0.51	0.33			0.63			0.58	
Uniform Delay, d1	17.8	16.6		18.0	9.2			33.9			33.3	
Progression Factor	1.00	1.00		1.00	1.00			0.40			0.34	
Incremental Delay, d2	6.4	0.8		4.3	0.4			3.2			2.4	
Delay (s)	24.3	17.5		22.3	9.6			16.9			13.8	
Level of Service	C	B		C	A			B			B	
Approach Delay (s)		18.8			12.7			16.9			13.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1084: Ashland Ave. □ W Monroe St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑↱			↑↱	
Volume (vph)	0	50	34	52	52	20	0	540	20	0	454	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.98			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.98			0.99			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1561			1572			2858			3019	
Flt Permitted		1.00			0.86			1.00			1.00	
Satd. Flow (perm)		1561			1378			2858			3019	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	53	36	55	55	21	0	568	21	0	478	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	89	0	0	131	0	0	589	0	0	479	0
Confl. Peds. (#/hr)	7		17	17		7			15			18
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	2%	5%	1%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		38.0			38.0			64.0			64.0	
Effective Green, g (s)		38.0			38.0			64.0			64.0	
Actuated g/C Ratio		0.35			0.35			0.58			0.58	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		539			476			1662			1756	
v/s Ratio Prot		0.06						c0.21			0.16	
v/s Ratio Perm					c0.10							
v/c Ratio		0.17			0.28			0.35			0.27	
Uniform Delay, d1		25.0			26.0			12.1			11.4	
Progression Factor		1.00			1.00			0.33			0.43	
Incremental Delay, d2		0.7			1.4			0.6			0.3	
Delay (s)		25.6			27.5			4.6			5.2	
Level of Service		C			C			A			A	
Approach Delay (s)		25.6			27.5			4.6			5.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1085: Ashland Ave. □ W Adams St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑↱			↑↱	
Volume (vph)	0	0	0	68	144	83	0	506	0	0	645	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.96			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					2939			2642			2908	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					2939			2642			2908	
Peak-hour factor, PHF	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	72	152	87	0	533	0	0	679	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	311	0	0	533	0	0	726	0
Confl. Peds. (#/hr)			8	8		32			17			33
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	6%	0%	0%	0%	1%	1%	0%	2%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								54			12	12
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					35.0			67.0			67.0	
Effective Green, g (s)					35.0			67.0			67.0	
Actuated g/C Ratio					0.32			0.61			0.61	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					935			1609			1771	
v/s Ratio Prot								0.20			c0.25	
v/s Ratio Perm					0.11							
v/c Ratio					0.33			0.33			0.41	
Uniform Delay, d1					28.6			10.5			11.2	
Progression Factor					1.00			0.28			0.63	
Incremental Delay, d2					1.0			0.5			0.7	
Delay (s)					29.6			3.5			7.7	
Level of Service					C			A			A	
Approach Delay (s)		0.0			29.6			3.5			7.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1086: Ashland Ave. □ W Jackson Blvd.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱			↑↑	
Volume (vph)	62	228	109	0	0	0	0	638	90	0	472	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0			4.0	
Lane Util. Factor		0.95	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.97					0.99			1.00	
Flpb, ped/bikes		1.00	1.00					1.00			1.00	
Frt		1.00	0.85					0.98			1.00	
Flt Protected		0.99	1.00					1.00			1.00	
Satd. Flow (prot)		3301	1472					3167			2889	
Flt Permitted		0.99	1.00					1.00			1.00	
Satd. Flow (perm)		3301	1472					3167			2889	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.88	0.95	0.92	0.95	0.95	0.88	0.95	0.95
Adj. Flow (vph)	65	240	115	0	0	0	0	672	95	0	497	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	305	115	0	0	0	0	767	0	0	497	0
Confl. Peds. (#/hr)	6		13			6			20			9
Heavy Vehicles (%)	0%	3%	1%	2%	0%	0%	2%	2%	1%	4%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4		4									
Actuated Green, G (s)		38.0	38.0					63.0			63.0	
Effective Green, g (s)		38.0	38.0					63.0			63.0	
Actuated g/C Ratio		0.35	0.35					0.57			0.57	
Clearance Time (s)		5.0	5.0					4.0			4.0	
Lane Grp Cap (vph)		1140	508					1813			1654	
v/s Ratio Prot								c0.24			0.17	
v/s Ratio Perm		0.09	0.08									
v/c Ratio		0.27	0.23					0.42			0.30	
Uniform Delay, d1		26.0	25.6					13.3			12.1	
Progression Factor		1.00	1.00					0.62			0.49	
Incremental Delay, d2		0.6	1.0					0.7			0.4	
Delay (s)		26.5	26.6					8.8			6.4	
Level of Service		C	C					A			A	
Approach Delay (s)		26.6			0.0			8.8			6.4	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1088: Ashland Ave. □ W Van Buren St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↰↑	↱	↰	↑↑			↑↱	
Volume (vph)	0	0	0	292	340	185	337	522	0	0	673	129
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				0.91	0.91	1.00	1.00	0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1475	3026	1396	1621	3079			2955	
Flt Permitted				0.95	0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1475	3026	1396	1621	3079			2955	
Peak-hour factor, PHF	0.91	0.99	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	0	0	0	307	358	195	355	549	0	0	708	136
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	215	450	195	355	549	0	0	844	0
Confl. Peds. (#/hr)						8	15		9			15
Confl. Bikes (#/hr)						3			1			9
Heavy Vehicles (%)	7%	0%	0%	2%	4%	3%	2%	2%	0%	0%	3%	1%
Parking (#/hr)								0			0	
Turn Type				Split	NA	Perm	Prot	NA			NA	
Protected Phases				8	8		5	5 6			6 16	
Permitted Phases						8						
Actuated Green, G (s)				21.0	21.0	21.0	38.0	57.0			39.0	
Effective Green, g (s)				21.0	21.0	21.0	38.0	57.0			37.0	
Actuated g/C Ratio				0.19	0.19	0.19	0.35	0.52			0.34	
Clearance Time (s)				4.0	4.0	4.0	4.0					
Lane Grp Cap (vph)				281	577	266	559	1595			993	
v/s Ratio Prot				0.15	c0.15		c0.22	0.18			c0.29	
v/s Ratio Perm						0.14						
v/c Ratio				0.77	0.78	0.73	0.64	0.34			0.85	
Uniform Delay, d1				42.2	42.3	41.9	30.2	15.5			33.9	
Progression Factor				1.00	1.00	1.00	0.50	0.43			0.70	
Incremental Delay, d2				17.9	10.0	16.4	2.4	0.3			9.0	
Delay (s)				60.0	52.3	58.2	17.6	7.0			32.8	
Level of Service				E	D	E	B	A			C	
Approach Delay (s)		0.0			55.6			11.2			32.8	
Approach LOS		A			E			B			C	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1089: Ashland Ave. □ W Congress Pkwy

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱		↰	↑↑	
Volume (vph)	192	268	258	0	0	0	0	732	322	256	609	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3290	1471					2911		1637	3031	
Flt Permitted		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		3290	1471					2911		1637	3031	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.96	0.95	0.96	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	202	282	272	0	0	0	0	771	339	269	641	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	484	272	0	0	0	0	1110	0	269	641	0
Confl. Peds. (#/hr)									3	3		2
Heavy Vehicles (%)	3%	1%	4%	1%	0%	0%	0%	2%	1%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2 12		1	1 2	
Permitted Phases			4									
Actuated Green, G (s)		26.0	26.0					44.0		28.0	56.0	
Effective Green, g (s)		26.0	26.0					42.0		28.0	56.0	
Actuated g/C Ratio		0.24	0.24					0.38		0.25	0.51	
Clearance Time (s)		4.0	4.0							4.0		
Lane Grp Cap (vph)		777	347					1111		416	1543	
v/s Ratio Prot		0.15						c0.38		c0.16	0.21	
v/s Ratio Perm			c0.18									
v/c Ratio		0.62	0.78					1.00		0.65	0.42	
Uniform Delay, d1		37.6	39.4					34.0		36.6	16.8	
Progression Factor		1.00	1.00					0.74		0.73	0.64	
Incremental Delay, d2		3.7	16.1					22.7		4.5	0.5	
Delay (s)		41.4	55.5					47.9		31.2	11.2	
Level of Service		D	E					D		C	B	
Approach Delay (s)		46.4			0.0			47.9			17.1	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	280	308	161	60	164	54	0	1018	84	0	689	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1488	2897		1521	2877			3041			2960	
Flt Permitted	0.50	0.92		0.44	1.00			1.00			1.00	
Satd. Flow (perm)	778	2663		705	2877			3041			2960	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	295	324	169	63	173	57	0	1072	88	0	725	107
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	248	540	0	63	230	0	0	1160	0	0	832	0
Confl. Peds. (#/hr)	29		84	84		29			36			18
Confl. Bikes (#/hr)			1			2			3			1
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	1%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA			NA			NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	43.0	43.0		21.0	21.0			57.0			57.0	
Effective Green, g (s)	43.0	43.0		21.0	21.0			57.0			57.0	
Actuated g/C Ratio	0.39	0.39		0.19	0.19			0.52			0.52	
Clearance Time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	426	1081		134	549			1575			1533	
v/s Ratio Prot	c0.10	0.09			0.08			c0.38			0.28	
v/s Ratio Perm	c0.13	0.11		0.09								
v/c Ratio	0.58	0.50		0.47	0.42			0.74			0.54	
Uniform Delay, d1	24.6	25.4		39.6	39.1			20.6			17.8	
Progression Factor	1.00	1.00		1.00	1.00			0.71			1.29	
Incremental Delay, d2	5.7	1.6		11.4	2.3			2.8			1.2	
Delay (s)	30.3	27.0		50.9	41.5			17.5			24.1	
Level of Service	C	C		D	D			B			C	
Approach Delay (s)		28.0			43.5			17.5			24.1	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1091: Ashland Ave. □ W Flourney St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✥			↑↱			↑↱	
Volume (vph)	360	0	91	0	0	4	0	825	4	0	723	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.98		0.98			1.00			1.00	
Flpb, ped/bikes	0.99		1.00		1.00			1.00			1.00	
Frt	1.00		0.85		0.86			1.00			1.00	
Flt Protected	0.95		1.00		1.00			1.00			1.00	
Satd. Flow (prot)	3077		1400		1533			3046			3064	
Flt Permitted	0.76		1.00		1.00			1.00			1.00	
Satd. Flow (perm)	2446		1400		1533			3046			3064	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.91	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	379	0	96	0	0	4	0	868	4	0	761	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	379	0	96	0	4	0	0	872	0	0	781	0
Confl. Peds. (#/hr)	3		6	6		3			18			11
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	37.0		37.0		37.0			64.0			64.0	
Effective Green, g (s)	37.0		37.0		37.0			64.0			64.0	
Actuated g/C Ratio	0.34		0.34		0.34			0.58			0.58	
Clearance Time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Grp Cap (vph)	822		470		515			1772			1782	
v/s Ratio Prot					0.00			c0.29			0.25	
v/s Ratio Perm	c0.15		0.07									
v/c Ratio	0.46		0.20		0.01			0.49			0.44	
Uniform Delay, d1	28.7		26.0		24.3			13.5			12.9	
Progression Factor	1.00		1.00		1.00			0.37			0.61	
Incremental Delay, d2	1.9		1.0		0.0			0.7			0.7	
Delay (s)	30.5		27.0		24.3			5.8			8.5	
Level of Service	C		C		C			A			A	
Approach Delay (s)		29.8			24.3			5.8			8.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↑↱			↑↱	
Volume (vph)	220	60	99	14	16	43	0	771	11	0	785	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.94			0.94			1.00			0.99	
Flpb, ped/bikes		0.95			0.98			1.00			1.00	
Frt		0.96			0.92			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1409			1394			3044			2998	
Flt Permitted		0.78			0.92			1.00			1.00	
Satd. Flow (perm)		1136			1291			3044			2998	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	63	104	15	17	45	0	812	12	0	826	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	399	0	0	77	0	0	824	0	0	853	0
Confl. Peds. (#/hr)	61		136	136		61			46			41
Confl. Bikes (#/hr)			10			6			8			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	1%	2%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		58.0			58.0			44.0			44.0	
Effective Green, g (s)		58.0			58.0			44.0			44.0	
Actuated g/C Ratio		0.53			0.53			0.40			0.40	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		598			680			1217			1199	
v/s Ratio Prot								0.27			c0.28	
v/s Ratio Perm		c0.35			0.06							
v/c Ratio		0.67			0.11			0.68			0.71	
Uniform Delay, d1		19.0			13.1			27.2			27.7	
Progression Factor		1.00			1.00			0.55			0.59	
Incremental Delay, d2		5.8			0.3			2.8			3.3	
Delay (s)		24.8			13.4			17.8			19.7	
Level of Service		C			B			B			B	
Approach Delay (s)		24.8			13.4			17.8			19.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1093: Ashland Ave. □ W Taylor St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	104	296	79	52	163	58	0	597	144	0	585	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.75		0.96			0.92	
Flpb, ped/bikes	0.83	1.00	1.00	0.96	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1318	1631	1280	1525	1615	1044		2834			2720	
Flt Permitted	0.60	1.00	1.00	0.44	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	835	1631	1280	702	1615	1044		2834			2720	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	109	312	83	55	172	61	0	628	152	0	616	165
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	109	312	83	55	172	61	0	780	0	0	781	0
Confl. Peds. (#/hr)	152		57	57		152			40			77
Confl. Bikes (#/hr)			8			3			3			2
Heavy Vehicles (%)	0%	3%	0%	0%	4%	3%	0%	3%	0%	6%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0		58.0			58.0	
Effective Green, g (s)	43.0	43.0	43.0	43.0	43.0	43.0		58.0			58.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.53			0.53	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Grp Cap (vph)	326	637	500	274	631	408		1494			1434	
v/s Ratio Prot		c0.19			0.11			0.28			c0.29	
v/s Ratio Perm	0.13		0.06	0.08		0.06						
v/c Ratio	0.33	0.49	0.17	0.20	0.27	0.15		0.52			0.54	
Uniform Delay, d1	23.5	25.2	21.8	22.1	22.8	21.7		17.0			17.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.37			0.49	
Incremental Delay, d2	2.7	2.7	0.7	1.6	1.1	0.8		1.0			1.1	
Delay (s)	26.2	27.9	22.5	23.8	23.9	22.4		24.3			9.5	
Level of Service	C	C	C	C	C	C		C			A	
Approach Delay (s)		26.7			23.6			24.3			9.5	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	136	1492	288	169	797	105	0	463	106	0	642	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.88	1.00	1.00	0.90		1.00	0.90		1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1575	3160	1261	1596	3099	1254		1550	1180		1673	1195
Flt Permitted	0.20	1.00	1.00	0.09	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	339	3160	1261	148	3099	1254		1550	1180		1673	1195
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	143	1571	303	178	839	111	0	487	112	0	676	120
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	143	1571	303	178	839	111	0	487	112	0	676	120
Confl. Peds. (#/hr)	76		47	47		76			78			62
Confl. Bikes (#/hr)			4			3			1			6
Heavy Vehicles (%)	1%	1%	0%	0%	3%	2%	5%	1%	0%	3%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	59.0	49.0	49.0	52.4	45.4	45.4		41.0	41.0		41.0	41.0
Effective Green, g (s)	59.0	49.0	49.0	52.4	45.4	45.4		41.0	41.0		41.0	41.0
Actuated g/C Ratio	0.54	0.45	0.45	0.48	0.41	0.41		0.37	0.37		0.37	0.37
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	5.0	3.0	3.0	5.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	300	1407	561	162	1279	517		577	439		623	445
v/s Ratio Prot	c0.05	c0.50		c0.07	0.27			0.31			c0.40	
v/s Ratio Perm	0.21		0.24	0.45		0.09			0.09			0.10
v/c Ratio	0.48	1.12	0.54	1.10	0.66	0.21		0.84	0.26		1.09	0.27
Uniform Delay, d1	15.2	30.5	22.3	27.7	26.0	20.8		31.6	23.9		34.5	24.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.74	0.82		0.57	0.49
Incremental Delay, d2	2.5	62.7	3.7	99.6	2.6	0.9		9.3	0.9		59.7	1.3
Delay (s)	17.7	93.2	26.0	127.3	28.6	21.8		32.5	20.5		79.3	13.1
Level of Service	B	F	C	F	C	C		C	C		E	B
Approach Delay (s)		77.8			43.5			30.2			69.3	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	61.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1096: Ashland Ave. □ W 13th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	191	0	314	5	0	2	0	550	0	0	597	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.96			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1556			1654			1520			1517	
Flt Permitted		0.87			0.84			1.00			1.00	
Satd. Flow (perm)		1384			1443			1520			1517	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.91	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	201	0	331	5	0	2	0	579	0	0	628	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	532	0	0	7	0	0	579	0	0	637	0
Confl. Peds. (#/hr)	7		7	7		7			28			5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	3%	0%	6%	0%	4%	3%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		46.1			46.1			55.9			55.9	
Effective Green, g (s)		46.1			46.1			55.9			55.9	
Actuated g/C Ratio		0.42			0.42			0.51			0.51	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		580			604			772			770	
v/s Ratio Prot								0.38			c0.42	
v/s Ratio Perm		c0.38			0.00							
v/c Ratio		0.92			0.01			0.75			0.83	
Uniform Delay, d1		30.1			18.7			21.5			23.0	
Progression Factor		1.00			1.00			0.47			0.86	
Incremental Delay, d2		20.3			0.0			6.0			5.7	
Delay (s)		50.4			18.7			16.0			25.5	
Level of Service		D			B			B			C	
Approach Delay (s)		50.4			18.7			16.0			25.5	
Approach LOS		D			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	0	0	198	16	0	6	0	475	0	0	581	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.91			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.97			1.00			1.00	
Frt		0.86			0.96			1.00			0.99	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1399			1624			1372			1520	
Flt Permitted		1.00			0.80			1.00			1.00	
Satd. Flow (perm)		1399			1351			1372			1520	
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.91	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	0	0	208	17	0	6	0	500	0	0	612	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	208	0	0	23	0	0	500	0	0	643	0
Confl. Peds. (#/hr)			24	24					12			14
Confl. Bikes (#/hr)			6						5			5
Heavy Vehicles (%)	7%	0%	1%	0%	0%	0%	2%	4%	0%	4%	2%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		29.0			29.0			73.0			73.0	
Effective Green, g (s)		29.0			29.0			73.0			73.0	
Actuated g/C Ratio		0.26			0.26			0.66			0.66	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		368			356			910			1008	
v/s Ratio Prot		c0.15						0.36			c0.42	
v/s Ratio Perm					0.02							
v/c Ratio		0.57			0.06			0.55			0.64	
Uniform Delay, d1		35.0			30.3			9.8			10.8	
Progression Factor		1.00			1.00			0.83			0.66	
Incremental Delay, d2		6.2			0.3			1.9			2.0	
Delay (s)		41.2			30.7			10.1			9.1	
Level of Service		D			C			B			A	
Approach Delay (s)		41.2			30.7			10.1			9.1	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	102	428	160	138	390	78	0	681	125	0	522	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.83	1.00	1.00	0.59		1.00	0.76		1.00	0.67
Flpb, ped/bikes	0.86	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1380	1663	1185	1511	1647	811		1351	1097		1326	940
Flt Permitted	0.29	1.00	1.00	0.25	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	427	1663	1185	395	1647	811		1351	1097		1326	940
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	107	451	168	145	411	82	0	717	132	0	549	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	107	451	168	145	411	82	0	717	132	0	549	66
Confl. Peds. (#/hr)	156		59	59		156			58			79
Confl. Bikes (#/hr)			6			11						4
Heavy Vehicles (%)	0%	1%	0%	1%	2%	4%	1%	3%	2%	6%	5%	6%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.0	39.0	39.0	39.0	39.0	39.0		60.0	60.0		60.0	60.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0		60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.55	0.55		0.55	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	151	589	420	140	583	287		736	598		723	512
v/s Ratio Prot		0.27			0.25			c0.53			0.41	
v/s Ratio Perm	0.25		0.14	c0.37		0.10			0.12			0.07
v/c Ratio	0.71	0.77	0.40	1.04	0.70	0.29		0.97	0.22		0.76	0.13
Uniform Delay, d1	30.6	31.5	26.7	35.5	30.5	25.5		24.2	12.9		19.4	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.76	0.72		0.97	0.93
Incremental Delay, d2	24.4	9.2	2.8	85.9	7.0	2.5		19.8	0.5		6.6	0.5
Delay (s)	55.0	40.6	29.5	121.4	37.6	28.0		38.2	9.8		25.5	11.9
Level of Service	E	D	C	F	D	C		D	A		C	B
Approach Delay (s)		40.2			55.4			33.8			24.0	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	46	45	15	51	75	61	0	798	26	0	670	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.95			0.99			0.99	
Flpb, ped/bikes		0.97			0.97			1.00			1.00	
Frt		0.98			0.96			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1638			1568			1382			1269	
Flt Permitted		0.71			0.88			1.00			1.00	
Satd. Flow (perm)		1185			1403			1382			1269	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	48	47	16	54	79	64	0	840	27	0	705	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	197	0	0	867	0	0	721	0
Confl. Peds. (#/hr)	44		50	50		44			66			46
Confl. Bikes (#/hr)			2			4			6			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	3%	0%	0%	6%	7%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			82.0			82.0	
Effective Green, g (s)		20.0			20.0			82.0			82.0	
Actuated g/C Ratio		0.18			0.18			0.75			0.75	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		215			255			1030			945	
v/s Ratio Prot								c0.63			0.57	
v/s Ratio Perm		0.09			c0.14							
v/c Ratio		0.52			0.77			0.84			0.76	
Uniform Delay, d1		40.6			42.8			9.6			8.3	
Progression Factor		1.00			1.00			0.24			0.76	
Incremental Delay, d2		8.6			20.0			4.7			4.0	
Delay (s)		49.2			62.9			7.0			10.3	
Level of Service		D			E			A			B	
Approach Delay (s)		49.2			62.9			7.0			10.3	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	39	78	27	148	99	30	0	725	51	0	646	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.97			0.99			0.99			1.00	
Flt Protected		0.99			0.97			1.00			1.00	
Satd. Flow (prot)		1700			1670			1331			1371	
Flt Permitted		0.86			0.70			1.00			1.00	
Satd. Flow (perm)		1477			1197			1331			1371	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	82	28	156	104	32	0	763	54	0	680	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	151	0	0	292	0	0	817	0	0	702	0
Confl. Peds. (#/hr)	33		17	17		33			18			20
Confl. Bikes (#/hr)			1			1			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	0%	3%	2%	2%	6%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.6			28.6			73.4			73.4	
Effective Green, g (s)		28.6			28.6			73.4			73.4	
Actuated g/C Ratio		0.26			0.26			0.67			0.67	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		384			311			888			914	
v/s Ratio Prot								c0.61			0.51	
v/s Ratio Perm		0.10			c0.24							
v/c Ratio		0.39			0.94			0.92			0.77	
Uniform Delay, d1		33.5			39.8			15.8			12.5	
Progression Factor		1.00			1.00			0.30			1.03	
Incremental Delay, d2		1.4			35.9			2.0			4.0	
Delay (s)		34.9			75.7			6.7			16.8	
Level of Service		C			E			A			B	
Approach Delay (s)		34.9			75.7			6.7			16.8	
Approach LOS		C			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↖	↑↱			↖	↑↱		↑	↗	↑	↗	
Volume (vph)	81	301	87	84	172	451	45	620	97	555	104	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	11	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95			1.00	0.95		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.98		1.00	0.98	1.00	0.86	
Flpb, ped/bikes	0.89	1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.97			1.00	0.99		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00			0.95	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1415	3045			1451	3066		895	701	1442	1069	
Flt Permitted	0.45	1.00			0.26	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (perm)	668	3045			398	3066		895	701	1442	1069	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	317	92	88	181	475	47	653	102	584	109	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	85	409	0	0	269	522	0	653	102	584	142	0
Confl. Peds. (#/hr)	99						99		6		53	
Confl. Bikes (#/hr)			2				6		6		1	
Heavy Vehicles (%)	0%	5%	2%	10%	10%	4%	3%	3%	8%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	3	0
Parking (#/hr)								74	74	6	6	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		NA	Perm	NA	Perm	
Protected Phases		4		3	3	8		2		6		
Permitted Phases	4			8	8				2		6	
Actuated Green, G (s)	19.9	19.9			29.9	29.9		53.0	53.0	53.0	53.0	
Effective Green, g (s)	19.9	19.9			29.9	29.9		53.0	53.0	53.0	53.0	
Actuated g/C Ratio	0.18	0.18			0.27	0.27		0.48	0.48	0.48	0.48	
Clearance Time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	120	550			175	833		431	337	694	515	
v/s Ratio Prot		0.13			c0.10	0.17		c0.73		0.41		
v/s Ratio Perm	0.13				c0.32				0.15		0.13	
v/c Ratio	0.71	0.74			1.54	0.63		1.52	0.30	0.84	0.28	
Uniform Delay, d1	42.3	42.6			38.3	35.2		28.5	17.3	24.8	17.0	
Progression Factor	1.00	1.00			1.00	1.00		0.97	0.96	0.73	0.82	
Incremental Delay, d2	17.4	5.4			268.2	1.5		241.9	2.0	6.2	0.2	
Delay (s)	59.7	48.0			306.5	36.6		269.7	18.7	24.3	14.1	
Level of Service	E	D			F	D		F	B	C	B	
Approach Delay (s)		50.0				128.4		235.8		22.3		
Approach LOS		D				F		F		C		

Intersection Summary			
HCM 2000 Control Delay	115.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

Movement	NEL2	NEL	NER	NER2
Lane Configurations				
Volume (vph)	4	97	159	47
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	11	11	12	12
Total Lost time (s)		4.0	4.0	
Lane Util. Factor		1.00	1.00	
Frpb, ped/bikes		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.85	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1637	1424	
Flt Permitted		0.99	1.00	
Satd. Flow (perm)		1706	1424	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	102	167	49
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	0	106	216	0
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Heavy Vehicles (%)	0%	1%	9%	2%
Bus Blockages (#/hr)	0	0	0	0
Parking (#/hr)				
Turn Type	Perm	NA	Perm	
Protected Phases		9		
Permitted Phases	9		9	
Actuated Green, G (s)		15.1	15.1	
Effective Green, g (s)		15.1	15.1	
Actuated g/C Ratio		0.14	0.14	
Clearance Time (s)		4.0	4.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		234	195	
v/s Ratio Prot				
v/s Ratio Perm		0.06	c0.15	
v/c Ratio		0.45	1.11	
Uniform Delay, d1		43.7	47.5	
Progression Factor		1.00	1.00	
Incremental Delay, d2		1.4	96.3	
Delay (s)		45.0	143.7	
Level of Service		D	F	
Approach Delay (s)		111.2		
Approach LOS		F		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1110: Ashland Ave. □ 2451 S Ashland Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	2	0	4	0	0	1	0	799	0	0	778	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.94			0.95			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.91			0.86			1.00			1.00	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1500			1473			1657			1722	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1525			1473			1657			1722	
Peak-hour factor, PHF	0.95	0.94	0.95	0.95	0.94	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	2	0	4	0	0	1	0	841	0	0	819	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	6	0	0	1	0	0	841	0	0	820	0
Confl. Peds. (#/hr)	1		2	2		1			1			12
Confl. Bikes (#/hr)									2			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	14%	5%	0%	25%	1%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		1.6			1.6			98.4			98.4	
Effective Green, g (s)		1.6			1.6			98.4			98.4	
Actuated g/C Ratio		0.01			0.01			0.89			0.89	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		22			21			1482			1540	
v/s Ratio Prot					0.00			c0.51			0.48	
v/s Ratio Perm		c0.00										
v/c Ratio		0.27			0.05			0.57			0.53	
Uniform Delay, d1		53.6			53.4			1.2			1.2	
Progression Factor		1.00			1.00			1.00			0.34	
Incremental Delay, d2		13.6			2.0			1.6			0.6	
Delay (s)		67.2			55.4			2.8			1.0	
Level of Service		E			E			A			A	
Approach Delay (s)		67.2			55.4			2.8			1.0	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1111: Ashland Ave. □ W 27th St.

8/8/2013

	↗	↘	↖	↑	↓	↙
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations	↰	↱		↑	↑	↱
Volume (vph)	0	0	0	785	778	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)				5.0	5.0	
Lane Util. Factor				1.00	1.00	
Frpb, ped/bikes				1.00	1.00	
Flpb, ped/bikes				1.00	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				1689	1689	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				1689	1689	
Peak-hour factor, PHF	0.95	0.95	0.96	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	826	819	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	826	819	0
Confl. Peds. (#/hr)		10				16
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	0%	0%	50%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	3
Turn Type		Perm		NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4				6
Actuated Green, G (s)				100.0	100.0	
Effective Green, g (s)				100.0	100.0	
Actuated g/C Ratio				1.00	1.00	
Clearance Time (s)				5.0	5.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				1689	1689	
v/s Ratio Prot				c0.49	0.48	
v/s Ratio Perm						
v/c Ratio				0.49	0.48	
Uniform Delay, d1				0.0	0.0	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.8	1.0	
Delay (s)				0.8	1.0	
Level of Service				A	A	
Approach Delay (s)	0.0			0.8	1.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	0.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1112: Ashland Ave. □ W Marketplace Access Rd.

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗		↑	↱	
Volume (vph)	8	18	0	692	706	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1710	1255		1171	1187	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1710	1255		1171	1187	
Peak-hour factor, PHF	0.95	0.95	0.92	0.95	0.95	0.95
Adj. Flow (vph)	8	19	0	728	743	5
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	8	19	0	728	748	0
Confl. Peds. (#/hr)		2				3
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	17%	29%	4%	4%	0%
Parking (#/hr)				40	38	
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	4.9	4.9		86.1	86.1	
Effective Green, g (s)	4.9	4.9		86.1	86.1	
Actuated g/C Ratio	0.05	0.05		0.86	0.86	
Clearance Time (s)	4.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	83	61		1008	1022	
v/s Ratio Prot	0.00			0.62	c0.63	
v/s Ratio Perm		c0.02				
v/c Ratio	0.10	0.31		0.72	0.73	
Uniform Delay, d1	45.4	45.9		2.6	2.6	
Progression Factor	1.00	1.00		1.58	1.00	
Incremental Delay, d2	0.5	2.9		3.8	4.1	
Delay (s)	45.9	48.8		7.8	6.7	
Level of Service	D	D		A	A	
Approach Delay (s)	48.0			7.8	6.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1113: Ashland Ave. □ W 31st Pl.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		✥			↱		↰	↑	↱
Volume (vph)	292	0	158	15	0	15	0	313	15	15	638	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Lane Util. Factor	1.00		1.00		1.00			1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00		0.98			0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00		1.00		1.00			1.00		0.96	1.00	1.00
Frt	1.00		0.85		0.93			0.99		1.00	1.00	0.85
Flt Protected	0.95		1.00		0.98			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1605		1232		802			1584		797	1689	1371
Flt Permitted	0.95		1.00		0.98			1.00		0.52	1.00	1.00
Satd. Flow (perm)	1605		1232		802			1584		440	1689	1371
Peak-hour factor, PHF	0.95	0.96	0.95	0.95	0.96	0.95	0.96	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	307	0	166	16	0	16	0	329	16	16	672	168
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	307	0	166	0	32	0	0	345	0	16	672	168
Confl. Peds. (#/hr)	2					2			70	70		3
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	3%	0%	20%	100%	0%	100%	0%	4%	100%	100%	3%	5%
Turn Type	Split		Perm	Split	NA			NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases			4							6		6
Actuated Green, G (s)	24.0		24.0		4.8			46.8		51.2	51.2	51.2
Effective Green, g (s)	24.0		24.0		4.8			46.8		51.2	51.2	51.2
Actuated g/C Ratio	0.24		0.24		0.05			0.47		0.51	0.51	0.51
Clearance Time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Vehicle Extension (s)	3.0		3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	385		295		38			741		233	864	701
v/s Ratio Prot	c0.19				c0.04			0.22		0.00	c0.40	
v/s Ratio Perm			0.13							0.03		0.12
v/c Ratio	0.80		0.56		0.84			0.47		0.07	0.78	0.24
Uniform Delay, d1	35.7		33.4		47.2			18.1		12.2	19.8	13.6
Progression Factor	1.00		1.00		1.00			0.82		0.74	0.89	0.86
Incremental Delay, d2	15.7		7.6		85.4			1.6		0.1	5.5	0.6
Delay (s)	51.4		41.0		132.6			16.5		9.1	23.2	12.3
Level of Service	D		D		F			B		A	C	B
Approach Delay (s)		47.7			132.6			16.5			20.8	
Approach LOS		D			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. □ S Archer Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↱			↱	
Volume (vph)	100	1049	115	178	991	47	0	301	99	0	454	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1651	4525		1635	4404			1406			1567	
Flt Permitted	0.18	1.00		0.11	1.00			1.00			1.00	
Satd. Flow (perm)	319	4525		183	4404			1406			1567	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	105	1104	121	187	1043	49	0	317	104	0	478	104
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	105	1225	0	187	1092	0	0	421	0	0	582	0
Confl. Peds. (#/hr)	24		69	69		24			65			25
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	2%	4%	1%	3%	7%	100%	7%	3%	7%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	41.1	34.7		47.6	38.2			42.4			42.4	
Effective Green, g (s)	41.1	34.7		47.6	38.2			42.4			42.4	
Actuated g/C Ratio	0.41	0.35		0.48	0.38			0.42			0.42	
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	216	1570		230	1682			596			664	
v/s Ratio Prot	0.03	0.27		c0.08	0.25			0.30			c0.37	
v/s Ratio Perm	0.17			c0.31								
v/c Ratio	0.49	0.78		0.81	0.65			0.71			0.88	
Uniform Delay, d1	19.1	29.2		19.8	25.4			23.7			26.4	
Progression Factor	1.00	1.00		1.00	1.00			0.87			0.63	
Incremental Delay, d2	3.6	2.6		19.3	2.0			6.7			11.0	
Delay (s)	22.6	31.8		39.1	27.4			27.4			27.7	
Level of Service	C	C		D	C			C			C	
Approach Delay (s)		31.1			29.1			27.4			27.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1115: Ashland Ave. □ W Robinson St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑			↱	
Volume (vph)	0	0	0	116	63	8	166	343	27	0	476	81
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	2.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	
Frpb, ped/bikes					1.00	0.96	1.00	0.99			0.99	
Flpb, ped/bikes					0.98	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	0.99			0.98	
Flt Protected					0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1630	1472	1496	1608			1571	
Flt Permitted					0.97	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1630	1472	559	1608			1571	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	122	66	8	175	361	28	0	501	85
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	188	8	175	389	0	0	586	0
Confl. Peds. (#/hr)			10	10		6	22		14			22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	10%	7%	0%	3%	8%	5%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					16.3	16.3	77.7	75.7			63.7	
Effective Green, g (s)					16.3	16.3	77.7	75.7			63.7	
Actuated g/C Ratio					0.16	0.16	0.78	0.76			0.64	
Clearance Time (s)					4.0	4.0	2.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					265	239	528	1217			1000	
v/s Ratio Prot							c0.03	0.24			c0.37	
v/s Ratio Perm					0.12	0.01	0.22					
v/c Ratio					0.71	0.03	0.33	0.32			0.59	
Uniform Delay, d1					39.6	35.2	8.6	3.9			10.5	
Progression Factor					1.00	1.00	0.56	0.45			0.56	
Incremental Delay, d2					8.4	0.1	0.3	0.6			1.3	
Delay (s)					48.0	35.3	5.1	2.4			7.1	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			47.5			3.2			7.1	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1118: Ashland Ave. □ W 33rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	⬏			✥			↑			↑	
Volume (vph)	16	41	44	0	0	39	0	462	10	0	488	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99			0.97			1.00			1.00	
Flpb, ped/bikes	0.99	1.00			1.00			1.00			1.00	
Frt	1.00	0.92			0.86			1.00			1.00	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1694	1606			1396			1064			1431	
Flt Permitted	0.73	1.00			1.00			1.00			1.00	
Satd. Flow (perm)	1302	1606			1396			1064			1431	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.95	0.92	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	17	43	46	0	0	41	0	486	11	0	514	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	89	0	0	41	0	0	497	0	0	515	0
Confl. Peds. (#/hr)	4		2			4			5			7
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	0%	0%	4%	2%	2%	8%	2%	6%	0%	14%	7%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	20.0	20.0			20.0			72.0			72.0	
Effective Green, g (s)	20.0	20.0			20.0			72.0			72.0	
Actuated g/C Ratio	0.20	0.20			0.20			0.72			0.72	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	260	321			279			766			1030	
v/s Ratio Prot		c0.06			0.03			c0.47			0.36	
v/s Ratio Perm	0.01											
v/c Ratio	0.07	0.28			0.15			0.65			0.50	
Uniform Delay, d1	32.4	33.9			33.0			7.4			6.1	
Progression Factor	1.00	1.00			1.00			0.85			0.69	
Incremental Delay, d2	0.5	2.1			1.1			3.3			1.4	
Delay (s)	32.9	36.0			34.1			9.6			5.7	
Level of Service	C	D			C			A			A	
Approach Delay (s)		35.5			34.1			9.6			5.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1121: Ashland Ave. □ W 35th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱	↱		↑	↱		↑	↱
Volume (vph)	60	320	93	74	310	108	0	538	36	0	443	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.94		1.00	0.92
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1532	1570	1238	1515	1538	1220		1192	959		1193	984
Flt Permitted	0.33	1.00	1.00	0.35	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	526	1570	1238	560	1538	1220		1192	959		1193	984
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	63	337	98	78	326	114	0	566	38	0	466	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	63	337	98	78	337	103	0	566	38	0	466	38
Confl. Peds. (#/hr)	11		12	12		11			12			17
Confl. Bikes (#/hr)						2			1			
Heavy Vehicles (%)	3%	7%	10%	4%	3%	6%	14%	8%	6%	17%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	30.0	30.0	30.0	30.0	30.0	30.0		61.0	61.0		61.0	61.0
Effective Green, g (s)	30.0	30.0	30.0	30.0	30.0	30.0		61.0	61.0		61.0	61.0
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30		0.61	0.61		0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	157	471	371	168	461	366		727	584		727	600
v/s Ratio Prot		0.21			c0.22			c0.47			0.39	
v/s Ratio Perm	0.12		0.08	0.14		0.08			0.04			0.04
v/c Ratio	0.40	0.72	0.26	0.46	0.73	0.28		0.78	0.07		0.64	0.06
Uniform Delay, d1	27.9	31.2	26.6	28.5	31.4	26.8		14.5	7.9		12.5	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.66	0.85		0.68	0.68
Incremental Delay, d2	7.5	9.0	1.7	9.0	9.8	1.9		7.3	0.2		3.9	0.2
Delay (s)	35.3	40.2	28.3	37.4	41.2	28.7		16.8	6.9		12.4	5.6
Level of Service	D	D	C	D	D	C		B	A		B	A
Approach Delay (s)		37.2			38.1			16.2			11.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	24	4	15	12	16	19	0	554	16	0	476	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.95			0.95			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1650			1583			1461			1488	
Flt Permitted		0.87			0.92			1.00			1.00	
Satd. Flow (perm)		1478			1469			1461			1488	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	4	16	13	17	20	0	583	17	0	501	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	50	0	0	600	0	0	510	0
Confl. Peds. (#/hr)	4					4						1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	11%	5%	7%	0%	19%	5%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		8.9			8.9			82.1			82.1	
Effective Green, g (s)		8.9			8.9			82.1			82.1	
Actuated g/C Ratio		0.09			0.09			0.82			0.82	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		131			130			1199			1221	
v/s Ratio Prot								c0.41			0.34	
v/s Ratio Perm		0.03			c0.03							
v/c Ratio		0.34			0.38			0.50			0.42	
Uniform Delay, d1		42.8			43.0			2.7			2.4	
Progression Factor		1.00			1.00			0.78			0.81	
Incremental Delay, d2		3.3			3.9			1.4			0.9	
Delay (s)		46.1			46.9			3.6			2.9	
Level of Service		D			D			A			A	
Approach Delay (s)		46.1			46.9			3.6			2.9	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1127: Ashland Ave. □ W Pershing Rd.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	15	217	146	166	500	123	0	432	45	0	494	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1653	3033	1394	1585	3119	1321		1398	1143		1374	1291
Flt Permitted	0.43	1.00	1.00	0.48	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	748	3033	1394	805	3119	1321		1398	1143		1374	1291
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	16	228	154	175	526	129	0	455	47	0	520	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	228	154	175	526	129	0	455	47	0	520	33
Confl. Peds. (#/hr)			3	3					4			4
Heavy Vehicles (%)	0%	9%	3%	4%	6%	12%	1%	12%	13%	16%	14%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	25.7	23.3	23.3	36.8	31.4	31.4		57.2	57.2		57.2	57.2
Effective Green, g (s)	25.7	23.3	23.3	36.8	31.4	31.4		57.2	57.2		57.2	57.2
Actuated g/C Ratio	0.26	0.23	0.23	0.37	0.31	0.31		0.57	0.57		0.57	0.57
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	213	706	324	378	979	414		799	653		785	738
v/s Ratio Prot	0.00	0.08		c0.05	c0.17			0.33			c0.38	
v/s Ratio Perm	0.02		0.11	0.12		0.10			0.04			0.03
v/c Ratio	0.08	0.32	0.48	0.46	0.54	0.31		0.57	0.07		0.66	0.04
Uniform Delay, d1	27.9	31.8	33.1	22.6	28.3	26.1		13.6	9.6		14.7	9.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.75	0.68
Incremental Delay, d2	0.2	1.2	4.9	0.9	2.1	2.0		2.9	0.2		2.0	0.0
Delay (s)	28.0	33.0	38.0	23.5	30.4	28.0		16.5	9.8		13.2	6.4
Level of Service	C	C	D	C	C	C		B	A		B	A
Approach Delay (s)		34.7			28.6			15.9			12.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1130: Ashland Ave. □ W 42nd St. (West)

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↑	↱	
Volume (vph)	32	20	0	368	617	42
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	11	11	11	11
Total Lost time (s)	5.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.95			1.00	0.99	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1556			1187	1652	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1556			1187	1652	
Peak-hour factor, PHF	0.95	0.95	0.96	0.95	0.95	0.95
Adj. Flow (vph)	34	21	0	387	649	44
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	55	0	0	387	693	0
Confl. Peds. (#/hr)	4	1				6
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	5%	0%	7%	4%	7%
Parking (#/hr)				34		
Turn Type	NA			NA	NA	
Protected Phases	4			2 9	6	
Permitted Phases						
Actuated Green, G (s)	11.0			69.0	62.0	
Effective Green, g (s)	11.0			69.0	62.0	
Actuated g/C Ratio	0.12			0.77	0.69	
Clearance Time (s)	5.0				3.0	
Vehicle Extension (s)	8.0				3.0	
Lane Grp Cap (vph)	190			910	1138	
v/s Ratio Prot	c0.04			c0.33	c0.42	
v/s Ratio Perm						
v/c Ratio	0.29			0.43	0.61	
Uniform Delay, d1	35.9			3.6	7.5	
Progression Factor	1.00			0.34	1.00	
Incremental Delay, d2	3.6			0.3	2.4	
Delay (s)	39.5			1.5	9.9	
Level of Service	D			A	A	
Approach Delay (s)	39.5			1.5	9.9	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑			↱	
Volume (vph)	8	0	22	0	11	5	0	361	1	0	376	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.90			0.96			1.00			0.99	
Flt Protected		0.99			1.00			1.00			1.00	
Satd. Flow (prot)		1599			1507			1491			1476	
Flt Permitted		0.93			1.00			1.00			1.00	
Satd. Flow (perm)		1510			1507			1491			1476	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	8	0	23	0	12	5	0	380	1	0	396	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	31	0	0	17	0	0	381	0	0	414	0
Confl. Peds. (#/hr)												4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	2%	5%	0%	67%	5%	12%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6 13	
Permitted Phases	4			8								
Actuated Green, G (s)		11.0			11.0			62.0			69.0	
Effective Green, g (s)		11.0			11.0			62.0			69.0	
Actuated g/C Ratio		0.12			0.12			0.69			0.77	
Clearance Time (s)		5.0			5.0			3.0				
Vehicle Extension (s)		8.0			8.0			3.0				
Lane Grp Cap (vph)		184			184			1027			1131	
v/s Ratio Prot					0.01			c0.26			c0.28	
v/s Ratio Perm		c0.02										
v/c Ratio		0.17			0.09			0.37			0.37	
Uniform Delay, d1		35.4			35.1			5.9			3.4	
Progression Factor		1.00			1.00			0.58			0.09	
Incremental Delay, d2		1.9			0.9			1.0			0.2	
Delay (s)		37.3			36.0			4.4			0.5	
Level of Service		D			D			A			A	
Approach Delay (s)		37.3			36.0			4.4			0.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	76	190	86	48	320	182	0	259	20	0	389	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97		1.00	0.97		1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1590	1515		1510	1600	1252		1259	1023		1221	979
Flt Permitted	0.41	1.00		0.47	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	690	1515		746	1600	1252		1259	1023		1221	979
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	80	200	91	51	337	192	0	273	21	0	409	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	80	291	0	51	337	192	0	273	21	0	409	67
Confl. Peds. (#/hr)	4		15	15		4			4			12
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	0%	5%	2%	4%	5%	11%	3%	5%	5%	22%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	32.0	32.0		32.0	32.0	32.0		49.0	49.0		49.0	49.0
Effective Green, g (s)	32.0	32.0		32.0	32.0	32.0		49.0	49.0		49.0	49.0
Actuated g/C Ratio	0.36	0.36		0.36	0.36	0.36		0.54	0.54		0.54	0.54
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	245	538		265	568	445		685	556		664	533
v/s Ratio Prot		0.19			c0.21			0.22			c0.33	
v/s Ratio Perm	0.12			0.07		0.15			0.02			0.07
v/c Ratio	0.33	0.54		0.19	0.59	0.43		0.40	0.04		0.62	0.13
Uniform Delay, d1	21.1	23.1		20.1	23.7	22.1		11.9	9.5		14.1	10.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.85	0.98		0.63	0.44
Incremental Delay, d2	3.5	3.9		1.6	4.5	3.0		1.7	0.1		4.1	0.5
Delay (s)	24.7	27.0		21.7	28.2	25.1		11.8	9.5		12.9	4.9
Level of Service	C	C		C	C	C		B	A		B	A
Approach Delay (s)		26.5			26.6			11.6			11.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1133: Ashland Ave. □ W 44th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	12	7	22	28	34	20	0	283	24	0	411	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.93			0.97			0.99			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1601			1621			1340			1133	
Flt Permitted		0.92			0.87			1.00			1.00	
Satd. Flow (perm)		1491			1435			1340			1133	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	7	23	29	36	21	0	298	25	0	433	39
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	43	0	0	86	0	0	323	0	0	472	0
Confl. Peds. (#/hr)	7		3	3		7			11			23
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	0%	7%	0%	6%	14%	5%	4%	10%	4%	5%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		9.8			9.8			71.2			71.2	
Effective Green, g (s)		9.8			9.8			71.2			71.2	
Actuated g/C Ratio		0.11			0.11			0.79			0.79	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		162			156			1060			896	
v/s Ratio Prot								0.24			c0.42	
v/s Ratio Perm		0.03			c0.06							
v/c Ratio		0.27			0.55			0.30			0.53	
Uniform Delay, d1		36.8			38.0			2.6			3.4	
Progression Factor		1.00			1.00			0.58			0.83	
Incremental Delay, d2		1.8			7.0			0.7			1.8	
Delay (s)		38.6			45.0			2.2			4.7	
Level of Service		D			D			A			A	
Approach Delay (s)		38.6			45.0			2.2			4.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1134: Ashland Ave. □ W 45th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	28	30	9	18	8	36	0	265	19	0	413	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.98			0.92			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1711			1586			1148			1167	
Flt Permitted		0.88			0.92			1.00			1.00	
Satd. Flow (perm)		1539			1483			1148			1167	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	29	32	9	19	8	38	0	279	20	0	435	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	65	0	0	299	0	0	471	0
Confl. Peds. (#/hr)	11		9	9		11			12			6
Confl. Bikes (#/hr)						1			2			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	5%	0%	0%	3%	3%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			58.0			58.0	
Effective Green, g (s)		23.0			23.0			58.0			58.0	
Actuated g/C Ratio		0.26			0.26			0.64			0.64	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		393			378			739			752	
v/s Ratio Prot								0.26			c0.40	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.18			0.17			0.40			0.63	
Uniform Delay, d1		26.1			26.1			7.7			9.5	
Progression Factor		1.00			1.00			0.76			0.48	
Incremental Delay, d2		1.0			1.0			1.6			3.5	
Delay (s)		27.1			27.1			7.4			8.0	
Level of Service		C			C			A			A	
Approach Delay (s)		27.1			27.1			7.4			8.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1135: Ashland Ave. □ W 46th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	36	78	49	12	33	51	0	234	45	0	379	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.95			0.97			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.96			0.93			0.98			0.98	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1648			1552			1129			1087	
Flt Permitted		0.92			0.96			1.00			1.00	
Satd. Flow (perm)		1533			1498			1129			1087	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	38	82	52	13	35	54	0	246	47	0	399	53
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	172	0	0	102	0	0	293	0	0	452	0
Confl. Peds. (#/hr)	37		9	9		37			39			14
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%	0%	5%	0%	2%	3%	4%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		21.0			21.0			61.0			61.0	
Effective Green, g (s)		21.0			21.0			61.0			61.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		357			349			765			736	
v/s Ratio Prot								0.26			c0.42	
v/s Ratio Perm		c0.11			0.07							
v/c Ratio		0.48			0.29			0.38			0.61	
Uniform Delay, d1		29.8			28.4			6.3			8.0	
Progression Factor		1.00			1.00			0.66			0.20	
Incremental Delay, d2		4.6			2.1			1.3			3.1	
Delay (s)		34.4			30.5			5.5			4.7	
Level of Service		C			C			A			A	
Approach Delay (s)		34.4			30.5			5.5			4.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1136: Ashland Ave. □ W 47th St. □ S. McDowell Ave.

8/8/2013

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	72	279	28	138	405	91	6	230	0	64	325	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.88		1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1478	2856		1540	2778			1041	1272		1506	1191
Flt Permitted	0.40	1.00		0.50	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	627	2856		802	2778			1041	1272		1506	1191
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	76	294	29	145	426	96	6	242	0	67	342	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	76	323	0	145	528	0	0	242	67	0	342	58
Confl. Peds. (#/hr)			53	53		74				75		25
Confl. Bikes (#/hr)						4				2		
Heavy Vehicles (%)	8%	9%	11%	1%	9%	6%	0%	7%	0%	2%	4%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								52			0	0
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	34.4	29.6		38.8	31.8			41.4	41.4		41.4	41.4
Effective Green, g (s)	34.4	29.6		38.8	31.8			41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.38	0.33		0.43	0.35			0.46	0.46		0.46	0.46
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	285	939		403	981			478	585		692	547
v/s Ratio Prot	0.01	0.11		c0.03	c0.19			c0.23			0.23	
v/s Ratio Perm	0.09			0.13					0.05			0.05
v/c Ratio	0.27	0.34		0.36	0.54			0.51	0.11		0.49	0.11
Uniform Delay, d1	18.2	22.9		16.2	23.2			17.1	13.9		17.0	13.8
Progression Factor	1.00	1.00		1.00	1.00			0.53	0.61		0.64	0.61
Incremental Delay, d2	0.5	1.0		0.6	2.1			3.5	0.4		2.0	0.3
Delay (s)	18.7	23.9		16.7	25.4			12.6	8.9		12.9	8.7
Level of Service	B	C		B	C			B	A		B	A
Approach Delay (s)		22.9			23.5			11.8			12.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SWR2
Lane Configurations	↱
Volume (vph)	25
Ideal Flow (vphpl)	1800
Lane Width	12
Total Lost time (s)	5.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	1557
Flt Permitted	1.00
Satd. Flow (perm)	1557
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	26
RTOR Reduction (vph)	0
Lane Group Flow (vph)	26
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	31.8
Effective Green, g (s)	31.8
Actuated g/C Ratio	0.35
Clearance Time (s)	5.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	550
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.05
Uniform Delay, d1	19.1
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	19.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1137: Ashland Ave. □ W 48th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↱	
Volume (vph)	0	0	0	22	44	18	0	322	0	0	617	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.97			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1642			1205			1073	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1642			1205			1073	
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.95	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	23	46	19	0	339	0	0	649	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	88	0	0	339	0	0	711	0
Confl. Peds. (#/hr)			20	20		21			10			27
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%	9%	4%	0%	0%	3%	5%
Parking (#/hr)								36			50	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			58.0			58.0	
Effective Green, g (s)					23.0			58.0			58.0	
Actuated g/C Ratio					0.26			0.64			0.64	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					419			776			691	
v/s Ratio Prot								0.28			c0.66	
v/s Ratio Perm					0.05							
v/c Ratio					0.21			0.44			1.03	
Uniform Delay, d1					26.4			7.9			16.0	
Progression Factor					1.00			1.08			0.76	
Incremental Delay, d2					1.1			1.7			41.2	
Delay (s)					27.5			10.2			53.4	
Level of Service					C			B			D	
Approach Delay (s)		0.0			27.5			10.2			53.4	
Approach LOS		A			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	44	74	24	12	29	24	0	232	34	0	411	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			0.99			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.98			0.95			0.98			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1706			1641			1108			1086	
Flt Permitted		0.89			0.94			1.00			1.00	
Satd. Flow (perm)		1549			1562			1108			1086	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	46	78	25	13	31	25	0	244	36	0	433	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	149	0	0	69	0	0	280	0	0	457	0
Confl. Peds. (#/hr)	17					17			18			26
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	4%	0%	0%	4%	0%	4%	3%	0%	3%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			57.0			57.0	
Effective Green, g (s)		24.0			24.0			57.0			57.0	
Actuated g/C Ratio		0.27			0.27			0.63			0.63	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		413			416			701			687	
v/s Ratio Prot								0.25			c0.42	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.36			0.17			0.40			0.67	
Uniform Delay, d1		26.8			25.3			8.1			10.5	
Progression Factor		1.00			1.00			0.76			0.10	
Incremental Delay, d2		2.4			0.9			1.6			0.5	
Delay (s)		29.2			26.2			7.8			1.5	
Level of Service		C			C			A			A	
Approach Delay (s)		29.2			26.2			7.8			1.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1139: Ashland Ave. □ W 50th St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	20	18	16	14	10	37	0	240	20	0	401	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.97			0.99			0.99	
Flpb, ped/bikes		0.99			0.98			1.00			1.00	
Frt		0.96			0.92			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1633			1565			1112			1473	
Flt Permitted		0.91			0.94			1.00			1.00	
Satd. Flow (perm)		1505			1496			1112			1473	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	21	19	17	15	11	39	0	253	21	0	422	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	57	0	0	65	0	0	274	0	0	465	0
Confl. Peds. (#/hr)	13		40	40		13			25			42
Confl. Bikes (#/hr)			1						2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	4%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		25.0			25.0			56.0			56.0	
Effective Green, g (s)		25.0			25.0			56.0			56.0	
Actuated g/C Ratio		0.28			0.28			0.62			0.62	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		418			415			691			916	
v/s Ratio Prot								0.25			c0.32	
v/s Ratio Perm		0.04			c0.04							
v/c Ratio		0.14			0.16			0.40			0.51	
Uniform Delay, d1		24.4			24.5			8.5			9.4	
Progression Factor		1.00			1.00			1.73			0.36	
Incremental Delay, d2		0.7			0.8			1.6			1.6	
Delay (s)		25.1			25.3			16.3			4.9	
Level of Service		C			C			B			A	
Approach Delay (s)		25.1			25.3			16.3			4.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1140: Ashland Ave. □ W 51st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	92	219	46	54	298	44	0	244	19	0	347	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.90		1.00	0.92		1.00	0.94
Flpb, ped/bikes	0.96	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1473	1631	1314	1476	1541	1259		1143	888		1088	879
Flt Permitted	0.43	1.00	1.00	0.54	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	670	1631	1314	842	1541	1259		1143	888		1088	879
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	231	48	57	314	46	0	257	20	0	365	57
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	97	231	48	57	314	46	0	257	20	0	365	57
Confl. Peds. (#/hr)	29		21	21		29			20			13
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	3%	0%	4%	9%	2%	3%	5%	5%	8%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0		50.0	50.0		50.0	50.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.56	0.56		0.56	0.56
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	230	561	452	290	530	433		635	493		604	488
v/s Ratio Prot		0.14			c0.20			0.22			c0.34	
v/s Ratio Perm	0.14		0.04	0.07		0.04			0.02			0.06
v/c Ratio	0.42	0.41	0.11	0.20	0.59	0.11		0.40	0.04		0.60	0.12
Uniform Delay, d1	22.6	22.5	20.1	20.7	24.3	20.1		11.5	9.1		13.4	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.33	0.41		0.35	0.44
Incremental Delay, d2	5.6	2.2	0.5	1.5	4.8	0.5		1.8	0.1		4.0	0.4
Delay (s)	28.2	24.8	20.5	22.3	29.1	20.6		5.6	3.9		8.6	4.6
Level of Service	C	C	C	C	C	C		A	A		A	A
Approach Delay (s)		25.1			27.2			5.5			8.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1142: Ashland Ave. □ W 53rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣			↑			↱	
Volume (vph)	0	0	0	16	10	13	0	282	3	0	421	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.95			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1607			1202			1106	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1607			1202			1106	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	17	11	14	0	297	3	0	443	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	42	0	0	300	0	0	463	0
Confl. Peds. (#/hr)			41	41		12			30			4
Confl. Bikes (#/hr)			4						3			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	20%	3%	5%
Parking (#/hr)								36			48	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			58.0			58.0	
Effective Green, g (s)					23.0			58.0			58.0	
Actuated g/C Ratio					0.26			0.64			0.64	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					410			774			712	
v/s Ratio Prot								0.25			c0.42	
v/s Ratio Perm					0.03							
v/c Ratio					0.10			0.39			0.65	
Uniform Delay, d1					25.6			7.6			9.8	
Progression Factor					1.00			0.58			1.03	
Incremental Delay, d2					0.5			1.4			4.0	
Delay (s)					26.1			5.8			14.1	
Level of Service					C			A			B	
Approach Delay (s)		0.0			26.1			5.8			14.1	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑			↑	↱
Volume (vph)	0	0	0	156	864	63	0	253	0	0	340	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	11	11	11	11	11	11
Total Lost time (s)				5.0	5.0	5.0		3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes				1.00	1.00	0.92		1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00		1.00			1.00	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1494	3129	1288		1464			1188	1006
Flt Permitted				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1494	3129	1288		1464			1188	1006
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.95	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	164	909	66	0	266	0	0	358	93
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	164	909	66	0	266	0	0	358	93
Confl. Peds. (#/hr)						41			29			19
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	3%	2%	2%	4%	7%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm		NA			NA	Perm
Protected Phases					8			2 5			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				31.0	31.0	31.0		36.0			42.0	42.0
Effective Green, g (s)				31.0	31.0	31.0		36.0			42.0	42.0
Actuated g/C Ratio				0.34	0.34	0.34		0.40			0.47	0.47
Clearance Time (s)				5.0	5.0	5.0					3.0	3.0
Lane Grp Cap (vph)				514	1077	443		585			554	469
v/s Ratio Prot					c0.29			c0.18			c0.30	
v/s Ratio Perm				0.11		0.05						0.09
v/c Ratio				0.32	0.84	0.15		0.45			0.65	0.20
Uniform Delay, d1				21.7	27.3	20.4		19.8			18.3	14.1
Progression Factor				1.00	1.00	1.00		0.53			0.65	0.61
Incremental Delay, d2				1.6	8.1	0.7		2.2			4.8	0.8
Delay (s)				23.4	35.4	21.1		12.8			16.7	9.4
Level of Service				C	D	C		B			B	A
Approach Delay (s)		0.0			32.8			12.8			15.2	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1145: Ashland Ave. □ W Garfield Blvd. (EB)

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱					↑	↱		↑	
Volume (vph)	69	709	115	0	0	0	0	256	124	0	468	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0		5.0	
Lane Util. Factor	1.00	0.95	1.00					1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.93					1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1494	3099	1283					1259	1102		1506	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1494	3099	1283					1259	1102		1506	
Peak-hour factor, PHF	0.95	0.95	0.95	0.94	0.94	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	73	746	121	0	0	0	0	269	131	0	493	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	73	746	121	0	0	0	0	269	131	0	493	0
Confl. Peds. (#/hr)			31						8			23
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	4%	0%	0%	0%	0%	5%	0%	4%	4%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			1 6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	31.0	31.0	31.0					32.0	32.0		49.0	
Effective Green, g (s)	31.0	31.0	31.0					32.0	32.0		49.0	
Actuated g/C Ratio	0.34	0.34	0.34					0.36	0.36		0.54	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0			
Lane Grp Cap (vph)	514	1067	441					447	391		819	
v/s Ratio Prot		c0.24						0.21			c0.33	
v/s Ratio Perm	0.05		0.09						0.12			
v/c Ratio	0.14	0.70	0.27					0.60	0.34		0.60	
Uniform Delay, d1	20.3	25.5	21.4					23.8	21.2		13.9	
Progression Factor	1.00	1.00	1.00					0.69	0.70		0.78	
Incremental Delay, d2	0.6	3.8	1.5					5.5	2.1		2.8	
Delay (s)	20.9	29.3	22.9					21.9	17.0		13.6	
Level of Service	C	C	C					C	B		B	
Approach Delay (s)		27.8			0.0			20.3			13.6	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1148: Ashland Ave. □ W 57th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣						↱			↑	
Volume (vph)	16	18	47	0	0	0	0	328	15	0	447	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.97						1.00			1.00	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.92						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1569						1172			1104	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1569						1172			1104	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	19	49	0	0	0	0	345	16	0	471	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	85	0	0	0	0	0	361	0	0	471	0
Confl. Peds. (#/hr)	42		16			42			22			29
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	4%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						58.0			58.0	
Effective Green, g (s)		23.0						58.0			58.0	
Actuated g/C Ratio		0.26						0.64			0.64	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		400						755			711	
v/s Ratio Prot								0.31			c0.43	
v/s Ratio Perm		0.05										
v/c Ratio		0.21						0.48			0.66	
Uniform Delay, d1		26.4						8.2			9.9	
Progression Factor		1.00						0.91			0.64	
Incremental Delay, d2		1.2						2.0			4.1	
Delay (s)		27.6						9.5			10.5	
Level of Service		C						A			B	
Approach Delay (s)		27.6			0.0			9.5			10.5	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1150: Ashland Ave. □ W 59th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	80	242	62	111	404	36	0	292	40	0	516	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.65	1.00	1.00	0.97		1.00	1.00		1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	0.91	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1594	1556	883	1457	1600	1340		1288	1125		1506	1220
Flt Permitted	0.33	1.00	1.00	0.48	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	553	1556	883	743	1600	1340		1288	1125		1506	1220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	84	255	65	117	425	38	0	307	42	0	543	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	255	65	117	425	38	0	307	42	0	543	37
Confl. Peds. (#/hr)	5		120	120		5						19
Heavy Vehicles (%)	0%	8%	5%	0%	5%	3%	2%	4%	0%	7%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	31.0	31.0	38.2	32.6	32.6		41.4	41.4		41.4	41.4
Effective Green, g (s)	35.0	31.0	31.0	38.2	32.6	32.6		41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.39	0.34	0.34	0.42	0.36	0.36		0.46	0.46		0.46	0.46
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	261	535	304	359	579	485		592	517		692	561
v/s Ratio Prot	0.01	0.16		c0.02	c0.27			0.24			c0.36	
v/s Ratio Perm	0.11		0.07	0.12		0.03			0.04			0.03
v/c Ratio	0.32	0.48	0.21	0.33	0.73	0.08		0.52	0.08		0.78	0.07
Uniform Delay, d1	18.5	23.1	20.9	16.5	24.9	18.8		17.2	13.6		20.5	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.96	0.86		0.86	1.16
Incremental Delay, d2	0.7	3.0	1.6	0.5	8.0	0.3		3.0	0.3		7.5	0.2
Delay (s)	19.2	26.2	22.5	17.0	33.0	19.2		19.6	12.0		25.2	15.9
Level of Service	B	C	C	B	C	B		B	B		C	B
Approach Delay (s)		24.1			28.8			18.7			24.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1152: Ashland Ave. □ W 61st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	31	24	50	0	0	0	0	309	28	0	553	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.94						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1808						1235			1064	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1808						1235			1064	
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	33	25	53	0	0	0	0	325	29	0	582	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	0	0	0	354	0	0	582	0
Confl. Peds. (#/hr)	10		16			10			38			28
Confl. Bikes (#/hr)									1			3
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	2%	0%	14%	3%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						58.0			58.0	
Effective Green, g (s)		23.0						58.0			58.0	
Actuated g/C Ratio		0.26						0.64			0.64	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		462						795			685	
v/s Ratio Prot								0.29			c0.55	
v/s Ratio Perm		0.06										
v/c Ratio		0.24						0.45			0.85	
Uniform Delay, d1		26.6						8.0			12.6	
Progression Factor		1.00						1.00			0.54	
Incremental Delay, d2		1.2						1.8			9.8	
Delay (s)		27.8						9.8			16.7	
Level of Service		C						A			B	
Approach Delay (s)		27.8			0.0			9.8			16.7	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1154: Ashland Ave. □ W 63rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	55	400	90	112	481	48	0	317	44	0	615	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	10	10	12	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	0.99			1.00	0.62		1.00	0.64
Flpb, ped/bikes	0.96	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1503	1615	1236	1517	1591			1673	782		1673	924
Flt Permitted	0.25	1.00	1.00	0.38	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	391	1615	1236	601	1591			1673	782		1673	924
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	58	421	95	118	506	51	0	334	46	0	647	82
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	58	421	95	118	557	0	0	334	46	0	647	82
Confl. Peds. (#/hr)	86		72	72		86			129			122
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	9%	4%	1%	0%	3%	0%	5%	4%	5%	2%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0			
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	39.0	39.0	39.0	39.0	39.0			44.0	44.0		44.0	44.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0			44.0	44.0		44.0	44.0
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43			0.49	0.49		0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	169	699	535	260	689			817	382		817	451
v/s Ratio Prot		0.26			c0.35			0.20			c0.39	
v/s Ratio Perm	0.15		0.08	0.20					0.06			0.09
v/c Ratio	0.34	0.60	0.18	0.45	0.81			0.41	0.12		0.79	0.18
Uniform Delay, d1	17.0	19.6	15.7	18.0	22.2			14.7	12.5		19.2	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.73	0.88		0.62	0.52
Incremental Delay, d2	5.5	3.8	0.7	5.6	9.9			1.5	0.6		6.0	0.7
Delay (s)	22.4	23.4	16.4	23.6	32.1			12.2	11.6		17.9	7.4
Level of Service	C	C	B	C	C			B	B		B	A
Approach Delay (s)		22.1			30.6			12.2			16.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1156: Ashland Ave. □ W 65th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↱	
Volume (vph)	0	0	0	12	22	27	0	352	0	0	494	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.94			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1847			1436			1201	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1847			1436			1201	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	13	23	28	0	371	0	0	520	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	64	0	0	371	0	0	545	0
Confl. Peds. (#/hr)			6	6		5			41			42
Confl. Bikes (#/hr)			1									3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Parking (#/hr)								10			36	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					7.8			73.2			73.2	
Effective Green, g (s)					7.8			73.2			73.2	
Actuated g/C Ratio					0.09			0.81			0.81	
Clearance Time (s)					5.0			4.0			4.0	
Vehicle Extension (s)					5.0			3.0			3.0	
Lane Grp Cap (vph)					160			1167			976	
v/s Ratio Prot								0.26			c0.45	
v/s Ratio Perm					0.03							
v/c Ratio					0.40			0.32			0.56	
Uniform Delay, d1					38.9			2.1			2.9	
Progression Factor					1.00			0.54			0.90	
Incremental Delay, d2					3.4			0.6			1.7	
Delay (s)					42.3			1.7			4.3	
Level of Service					D			A			A	
Approach Delay (s)		0.0			42.3			1.7			4.3	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1158: Ashland Ave. □ W Marquette Rd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	48	340	92	112	387	30	0	345	30	0	462	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1531	1647	1300	1531	1680	1351		1180			1129	
Flt Permitted	0.35	1.00	1.00	0.35	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	567	1647	1300	557	1680	1351		1180			1129	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	51	358	97	118	407	32	0	363	32	0	486	34
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	51	358	97	118	407	32	0	395	0	0	520	0
Confl. Peds. (#/hr)	21		22	22		21			32			32
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	2%	4%	0%	0%	0%	0%	3%	0%	10%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	33.2	30.2	30.2	37.2	32.2	32.2		41.8			41.8	
Effective Green, g (s)	33.2	30.2	30.2	37.2	32.2	32.2		41.8			41.8	
Actuated g/C Ratio	0.37	0.34	0.34	0.41	0.36	0.36		0.46			0.46	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	241	552	436	284	601	483		548			524	
v/s Ratio Prot	0.01	0.22		c0.02	c0.24			0.33			c0.46	
v/s Ratio Perm	0.07		0.07	0.15		0.02						
v/c Ratio	0.21	0.65	0.22	0.42	0.68	0.07		0.72			0.99	
Uniform Delay, d1	19.1	25.4	21.5	17.7	24.5	19.0		19.4			23.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.97			0.63	
Incremental Delay, d2	0.4	5.8	1.2	1.0	6.0	0.3		7.5			34.9	
Delay (s)	19.6	31.2	22.6	18.7	30.5	19.3		26.3			49.9	
Level of Service	B	C	C	B	C	B		C			D	
Approach Delay (s)		28.4			27.4			26.3			49.9	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1160: Ashland Ave. □ W 69th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰	↱		↑	↱		↑	↱
Volume (vph)	42	291	52	64	292	34	0	278	58	0	492	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.81		1.00	0.91		1.00	0.84
Flpb, ped/bikes		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Frt		0.98			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		3037			1642	1164		1149	1342		1037	1229
Flt Permitted		0.81			0.85	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		2461			1414	1164		1149	1342		1037	1229
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	306	55	67	307	36	0	293	61	0	518	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	405	0	0	374	36	0	293	61	0	518	75
Confl. Peds. (#/hr)	91		48	48		91			52			54
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	0%	3%	10%	0%	5%	3%	6%	3%	0%	4%	4%	1%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)		29.0			29.0	29.0		52.0	52.0		52.0	52.0
Effective Green, g (s)		29.0			29.0	29.0		52.0	52.0		52.0	52.0
Actuated g/C Ratio		0.32			0.32	0.32		0.58	0.58		0.58	0.58
Clearance Time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		792			455	375		663	775		599	710
v/s Ratio Prot								0.26			c0.50	
v/s Ratio Perm		0.16			c0.26	0.03			0.05			0.06
v/c Ratio		0.51			0.82	0.10		0.44	0.08		0.86	0.11
Uniform Delay, d1		24.8			28.1	21.3		10.8	8.4		16.0	8.5
Progression Factor		1.00			1.00	1.00		1.21	1.08		0.65	0.54
Incremental Delay, d2		2.4			15.3	0.5		2.0	0.2		11.4	0.2
Delay (s)		27.1			43.5	21.8		15.0	9.3		21.8	4.8
Level of Service		C			D	C		B	A		C	A
Approach Delay (s)		27.1			41.6			14.0			19.6	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. □ W 71st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	61	337	78	107	368	84	0	319	15	0	537	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.92		1.00			0.99	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1537	1647	1324	1551	1663	1294		1424			1494	
Flt Permitted	0.31	1.00	1.00	0.36	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	506	1647	1324	580	1663	1294		1424			1494	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	64	355	82	113	387	88	0	336	16	0	565	55
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	64	355	82	113	387	88	0	352	0	0	620	0
Confl. Peds. (#/hr)	38		31	31		38			20			29
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	2%	0%	2%	1%	1%	8%	3%	0%	7%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	32.6	28.6	28.6	32.6	28.6	28.6		45.4			45.4	
Effective Green, g (s)	32.6	28.6	28.6	32.6	28.6	28.6		45.4			45.4	
Actuated g/C Ratio	0.36	0.32	0.32	0.36	0.32	0.32		0.50			0.50	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	229	523	420	253	528	411		718			753	
v/s Ratio Prot	0.01	0.22		c0.02	c0.23			0.25			c0.42	
v/s Ratio Perm	0.09		0.06	0.14		0.07						
v/c Ratio	0.28	0.68	0.20	0.45	0.73	0.21		0.49			0.82	
Uniform Delay, d1	19.9	26.7	22.3	21.2	27.3	22.5		14.7			18.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			0.60	
Incremental Delay, d2	0.7	6.9	1.0	1.3	8.7	1.2		2.4			5.6	
Delay (s)	20.6	33.6	23.4	22.5	36.0	23.7		17.1			17.0	
Level of Service	C	C	C	C	D	C		B			B	
Approach Delay (s)		30.3			31.6			17.1			17.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1168: Ashland Ave. □ W 74th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↑	↱		↑	↱
Volume (vph)	41	157	60	49	339	88	0	260	21	0	557	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.91		1.00	0.96		1.00	0.94		1.00	0.88
Flpb, ped/bikes		1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1617	1265		1603	1373		1520	1385		1520	1204
Flt Permitted		0.83	1.00		0.94	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1352	1265		1509	1373		1520	1385		1520	1204
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	43	165	63	52	357	93	0	274	22	0	586	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	208	63	0	409	93	0	274	22	0	586	38
Confl. Peds. (#/hr)	12		44	44		12			19			44
Heavy Vehicles (%)	0%	8%	3%	0%	4%	0%	9%	3%	0%	5%	3%	8%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		28.0	28.0		28.0	28.0		38.0	38.0		38.0	38.0
Effective Green, g (s)		28.0	28.0		28.0	28.0		38.0	38.0		38.0	38.0
Actuated g/C Ratio		0.37	0.37		0.37	0.37		0.51	0.51		0.51	0.51
Clearance Time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		504	472		563	512		770	701		770	610
v/s Ratio Prot								0.18			c0.39	
v/s Ratio Perm		0.15	0.05		c0.27	0.07			0.02			0.03
v/c Ratio		0.41	0.13		0.73	0.18		0.36	0.03		0.76	0.06
Uniform Delay, d1		17.4	15.5		20.2	15.8		11.1	9.3		14.9	9.4
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.04		1.00	1.00
Incremental Delay, d2		2.5	0.6		8.0	0.8		1.2	0.1		7.0	0.2
Delay (s)		19.9	16.1		28.2	16.6		12.3	9.8		21.8	9.6
Level of Service		B	B		C	B		B	A		C	A
Approach Delay (s)		19.0			26.0			12.1			21.1	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1170: Ashland Ave. □ W 76th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↑↱			↑↱	
Volume (vph)	64	290	37	88	313	82	0	210	35	0	505	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.98			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		3044			3014			1251			1177	
Flt Permitted		0.78			0.77			1.00			1.00	
Satd. Flow (perm)		2394			2342			1251			1177	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	67	305	39	93	329	86	0	221	37	0	532	34
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	411	0	0	508	0	0	258	0	0	566	0
Confl. Peds. (#/hr)	6		20	20		6			5			8
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	3%	2%	0%	0%	2%	1%	0%	4%	0%	7%	4%	3%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			42.0			42.0	
Effective Green, g (s)		24.0			24.0			42.0			42.0	
Actuated g/C Ratio		0.32			0.32			0.56			0.56	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		766			749			700			659	
v/s Ratio Prot								0.21			c0.48	
v/s Ratio Perm		0.17			c0.22							
v/c Ratio		0.54			0.68			0.37			0.86	
Uniform Delay, d1		20.9			22.1			9.1			14.0	
Progression Factor		1.00			1.00			1.00			0.42	
Incremental Delay, d2		2.7			4.9			1.5			10.7	
Delay (s)		23.6			27.0			10.6			16.6	
Level of Service		C			C			B			B	
Approach Delay (s)		23.6			27.0			10.6			16.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1173: Ashland Ave. □ W 79th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	96	451	30	64	479	73	0	189	28	0	553	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.81	1.00	1.00	0.89		1.00	0.80		1.00	0.91
Flpb, ped/bikes	0.97	1.00	1.00	0.94	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1493	1585	1118	1447	1600	1210		1188	834		1166	900
Flt Permitted	0.19	1.00	1.00	0.22	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	295	1585	1118	338	1600	1210		1188	834		1166	900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	101	475	32	67	504	77	0	199	29	0	582	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	101	475	32	67	504	77	0	199	29	0	582	67
Confl. Peds. (#/hr)	54		99	99		54			68			27
Confl. Bikes (#/hr)			1			1			1			
Heavy Vehicles (%)	0%	6%	0%	0%	5%	1%	7%	4%	0%	10%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.0	34.0	34.0	34.0	34.0	34.0		50.0	50.0		50.0	50.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.50	0.50		0.50	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	100	538	380	114	544	411		594	417		583	450
v/s Ratio Prot		0.30			0.32			0.17			c0.50	
v/s Ratio Perm	c0.34		0.03	0.20		0.06			0.03			0.07
v/c Ratio	1.01	0.88	0.08	0.59	0.93	0.19		0.34	0.07		1.00	0.15
Uniform Delay, d1	33.0	31.1	22.4	27.2	31.8	23.3		15.0	13.0		25.0	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.51	1.54		1.00	1.00
Incremental Delay, d2	92.7	18.6	0.4	20.3	24.1	1.0		1.4	0.3		36.9	0.7
Delay (s)	125.7	49.8	22.9	47.5	55.9	24.3		24.1	20.2		61.8	14.2
Level of Service	F	D	C	D	E	C		C	C		E	B
Approach Delay (s)		61.0			51.3			23.6			56.9	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1175: Ashland Ave. □ W 81st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↑			↳	
Volume (vph)	0	0	0	48	72	50	0	331	0	0	622	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)					5.0	5.0		4.0			4.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.93		1.00			0.97	
Flpb, ped/bikes					0.97	1.00		1.00			1.00	
Frt					1.00	0.85		1.00			0.98	
Flt Protected					0.98	1.00		1.00			1.00	
Satd. Flow (prot)					1602	1297		1160			1007	
Flt Permitted					0.98	1.00		1.00			1.00	
Satd. Flow (perm)					1602	1297		1160			1007	
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	0	0	0	51	76	53	0	348	0	0	655	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	127	53	0	348	0	0	780	0
Confl. Peds. (#/hr)			31	31		25			62			51
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	3%	2%	0%	0%	3%	2%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					23.0	23.0		68.0			68.0	
Effective Green, g (s)					23.0	23.0		68.0			68.0	
Actuated g/C Ratio					0.23	0.23		0.68			0.68	
Clearance Time (s)					5.0	5.0		4.0			4.0	
Lane Grp Cap (vph)					368	298		788			684	
v/s Ratio Prot								0.30			c0.77	
v/s Ratio Perm					0.08	0.04						
v/c Ratio					0.35	0.18		0.44			1.14	
Uniform Delay, d1					32.2	30.9		7.3			16.0	
Progression Factor					1.00	1.00		0.62			0.45	
Incremental Delay, d2					2.6	1.3		1.7			73.7	
Delay (s)					34.8	32.2		6.2			80.9	
Level of Service					C	C		A			F	
Approach Delay (s)		0.0			34.0			6.2			80.9	
Approach LOS		A			C			A			F	

Intersection Summary			
HCM 2000 Control Delay	54.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1177: Ashland Ave. □ W 83rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	75	359	105	95	355	66	0	318	52	0	627	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	0.99			1.00	0.80		1.00	0.92
Flpb, ped/bikes	0.98	1.00	1.00	0.96	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1520	1631	1248	1534	3087			1327	904		1081	862
Flt Permitted	0.39	1.00	1.00	0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	620	1631	1248	405	3087			1327	904		1081	862
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	79	378	111	100	374	69	0	335	55	0	660	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	79	378	111	100	443	0	0	335	55	0	660	43
Confl. Peds. (#/hr)	14		47	47		14			65			59
Heavy Vehicles (%)	3%	3%	2%	0%	0%	0%	2%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	27.0	27.0	27.0	27.0	27.0			64.0	64.0		64.0	64.0
Effective Green, g (s)	27.0	27.0	27.0	27.0	27.0			64.0	64.0		64.0	64.0
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.64	0.64		0.64	0.64
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	167	440	336	109	833			849	578		691	551
v/s Ratio Prot		0.23			0.14			0.25			c0.61	
v/s Ratio Perm	0.13		0.09	c0.25					0.06			0.05
v/c Ratio	0.47	0.86	0.33	0.92	0.53			0.39	0.10		0.96	0.08
Uniform Delay, d1	30.5	34.7	29.3	35.4	31.1			8.7	6.9		16.7	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.75	0.73		0.47	0.68
Incremental Delay, d2	9.3	19.2	2.6	66.1	2.4			1.3	0.3		4.1	0.0
Delay (s)	39.9	53.8	31.9	101.5	33.5			7.8	5.4		12.0	4.6
Level of Service	D	D	C	F	C			A	A		B	A
Approach Delay (s)		47.6			46.0			7.5			11.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1179: Ashland Ave. □ W 85th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣						↱			↑	
Volume (vph)	38	26	38	0	0	0	0	314	45	0	721	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.95						0.98			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1616						1147			1149	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1616						1147			1149	
Peak-hour factor, PHF	0.95	0.95	0.95	0.90	0.90	0.95	0.90	0.95	0.95	0.90	0.95	0.95
Adj. Flow (vph)	40	27	40	0	0	0	0	331	47	0	759	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	107	0	0	0	0	0	378	0	0	759	0
Confl. Peds. (#/hr)	11		5			11			19			16
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		10.0						81.0			81.0	
Effective Green, g (s)		10.0						81.0			81.0	
Actuated g/C Ratio		0.10						0.81			0.81	
Clearance Time (s)		5.0						4.0			4.0	
Vehicle Extension (s)		6.0						3.0			3.0	
Lane Grp Cap (vph)		161						929			930	
v/s Ratio Prot								0.33			c0.66	
v/s Ratio Perm		0.07										
v/c Ratio		0.66						0.41			0.82	
Uniform Delay, d1		43.4						2.7			5.3	
Progression Factor		1.00						0.99			0.63	
Incremental Delay, d2		15.1						1.2			4.1	
Delay (s)		58.5						3.9			7.5	
Level of Service		E						A			A	
Approach Delay (s)		58.5			0.0			3.9			7.5	
Approach LOS		E			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. □ W 87th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	94	838	174	126	1092	157	0	297	38	0	542	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.90		1.00	0.90		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1596	3179	1207	1562	3210	1253		1262	973		1092	883
Flt Permitted	0.12	1.00	1.00	0.13	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	207	3179	1207	214	3210	1253		1262	973		1092	883
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	99	882	183	133	1149	165	0	313	40	0	571	89
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	99	882	183	133	1149	165	0	313	40	0	571	89
Confl. Peds. (#/hr)	39		56	56		39			78			22
Heavy Vehicles (%)	0%	4%	3%	2%	3%	3%	3%	2%	0%	3%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	37.2	32.4	32.4	41.4	34.6	34.6		48.6	48.6		48.6	48.6
Effective Green, g (s)	37.2	32.4	32.4	41.4	34.6	34.6		48.6	48.6		48.6	48.6
Actuated g/C Ratio	0.37	0.32	0.32	0.41	0.35	0.35		0.49	0.49		0.49	0.49
Clearance Time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	143	1029	391	182	1110	433		613	472		530	429
v/s Ratio Prot	0.03	0.28		c0.05	c0.36			0.25			c0.52	
v/s Ratio Perm	0.22		0.15	0.25		0.13			0.04			0.10
v/c Ratio	0.69	0.86	0.47	0.73	1.04	0.38		0.51	0.08		1.08	0.21
Uniform Delay, d1	24.7	31.6	26.9	21.6	32.7	24.6		17.6	13.8		25.7	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.86	0.91		0.80	0.69
Incremental Delay, d2	13.5	9.2	4.0	14.0	36.5	2.5		2.9	0.3		52.5	0.6
Delay (s)	38.3	40.8	30.9	35.6	69.2	27.2		18.0	12.8		73.1	10.8
Level of Service	D	D	C	D	E	C		B	B		E	B
Approach Delay (s)		39.0			61.3			17.4			64.7	
Approach LOS		D			E			B			E	

Intersection Summary			
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. □ W 91st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑	↱		↑	↱
Volume (vph)	15	30	34	35	6	27	0	356	20	0	663	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.97			0.97			1.00	0.91		1.00	0.96
Flpb, ped/bikes		0.99			0.98			1.00	1.00		1.00	1.00
Frt		0.94			0.95			1.00	0.85		1.00	0.85
Flt Protected		0.99			0.97			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1515			1486			1054	1349		1166	1416
Flt Permitted		0.93			0.79			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1427			1206			1054	1349		1166	1416
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	32	36	37	6	28	0	375	21	0	698	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	84	0	0	71	0	0	375	21	0	698	8
Confl. Peds. (#/hr)	11		9	9		11			18			6
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	4%	0%	11%	3%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		12.0			12.0			79.0	79.0		79.0	79.0
Effective Green, g (s)		12.0			12.0			79.0	79.0		79.0	79.0
Actuated g/C Ratio		0.12			0.12			0.79	0.79		0.79	0.79
Clearance Time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		8.0			8.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		171			144			832	1065		921	1118
v/s Ratio Prot								0.36			c0.60	
v/s Ratio Perm		0.06			c0.06				0.02			0.01
v/c Ratio		0.49			0.49			0.45	0.02		0.76	0.01
Uniform Delay, d1		41.1			41.2			3.4	2.2		5.5	2.2
Progression Factor		1.00			1.00			1.00	1.00		0.59	0.70
Incremental Delay, d2		9.2			10.9			1.8	0.0		3.5	0.0
Delay (s)		50.3			52.1			5.2	2.3		6.8	1.6
Level of Service		D			D			A	A		A	A
Approach Delay (s)		50.3			52.1			5.0			6.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1191: Ashland Ave. □ W 95th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	157	668	68	22	820	156	0	317	19	0	429	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.99			1.00	0.94		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1549	3149	1330	1584	3119			1520	1237		1520	1241
Flt Permitted	0.13	1.00	1.00	0.36	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	204	3149	1330	608	3119			1520	1237		1520	1241
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	165	703	72	23	863	164	0	334	20	0	452	119
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	165	703	72	23	1027	0	0	334	20	0	452	119
Confl. Peds. (#/hr)	30		39	39		30			52			18
Heavy Vehicles (%)	3%	5%	2%	0%	2%	4%	2%	3%	0%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	52.7	47.7	47.7	42.8	40.8			39.0	39.0		39.0	39.0
Effective Green, g (s)	52.7	47.7	47.7	42.8	40.8			39.0	39.0		39.0	39.0
Actuated g/C Ratio	0.52	0.47	0.47	0.42	0.40			0.38	0.38		0.38	0.38
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	223	1476	623	275	1251			582	474		582	475
v/s Ratio Prot	c0.06	0.22		0.00	c0.33			0.22			c0.30	
v/s Ratio Perm	0.32		0.05	0.03					0.02			0.10
v/c Ratio	0.74	0.48	0.12	0.08	0.82			0.57	0.04		0.78	0.25
Uniform Delay, d1	17.7	18.5	15.2	17.3	27.2			24.8	19.6		27.5	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	12.1	1.1	0.4	0.1	6.1			4.1	0.2		9.8	1.3
Delay (s)	29.8	19.6	15.5	17.5	33.3			28.9	19.8		37.3	22.6
Level of Service	C	B	B	B	C			C	B		D	C
Approach Delay (s)		21.1			33.0			28.3			34.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	101.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix B-3: Traffic Mitigation Analysis

Mitigated Build Alternative Level of Service Results

(Proposed Mitigations within Existing Curb-to-Curb Width)

HCM Signalized Intersection Capacity Analysis
1001: Ashland Ave. □ W Irving Park Rd.

8/8/2013

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	216	906	138	128	910	39	0	569	72	0	796	111
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.50	1.00	0.98			1.00	0.63		1.00	0.79
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1565	3040	685	1550	3070			1228	622		1550	1019
Flt Permitted	0.10	1.00	1.00	0.11	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	161	3040	685	172	3070			1228	622		1550	1019
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	1.00	0.91	0.91	1.00	0.91	0.91
Adj. Flow (vph)	237	996	152	141	1000	43	0	625	79	0	875	122
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	237	996	152	141	1043	0	0	625	79	0	875	122
Confl. Peds. (#/hr)	239		202	202		239			378			144
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	2%	5%	5%	3%	1%	3%	2%	2%	6%	1%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								36	36		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	52.0	42.0	42.0	45.0	38.0			68.0	68.0		68.0	68.0
Effective Green, g (s)	52.0	42.0	42.0	45.0	38.0			68.0	68.0		68.0	68.0
Actuated g/C Ratio	0.40	0.32	0.32	0.35	0.29			0.52	0.52		0.52	0.52
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2			0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	183	982	221	133	897			642	325		810	533
v/s Ratio Prot	c0.11	0.33		0.06	0.34			0.51			c0.56	
v/s Ratio Perm	c0.41		0.22	0.31					0.13			0.12
v/c Ratio	1.30	1.01	0.69	1.06	1.16			0.97	0.24		1.08	0.23
Uniform Delay, d1	35.8	44.0	38.3	36.9	46.0			30.1	16.9		31.0	16.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.80	0.81		1.00	1.00
Incremental Delay, d2	167.1	32.3	6.9	95.0	85.5			14.3	0.5		55.6	1.0
Delay (s)	202.9	76.3	45.2	131.9	131.5			38.4	14.2		86.6	17.8
Level of Service	F	E	D	F	F			D	B		F	B
Approach Delay (s)		94.6			131.6			35.7			78.1	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	91.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1003: Ashland Ave. □ W Grace St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	56	92	48	0	0	0	0	722	36	0	660	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.95						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1416						1124			1208	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1416						1124			1208	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.97	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	62	101	53	0	0	0	0	793	40	0	725	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	216	0	0	0	0	0	833	0	0	733	0
Confl. Peds. (#/hr)	62		25			62			19			16
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	4%	3%	3%	2%	0%
Parking (#/hr)								44			38	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		22.0						100.0			100.0	
Effective Green, g (s)		22.0						100.0			100.0	
Actuated g/C Ratio		0.17						0.77			0.77	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		239						864			929	
v/s Ratio Prot								c0.74			0.61	
v/s Ratio Perm		0.15										
v/c Ratio		0.90						0.96			0.79	
Uniform Delay, d1		53.0						13.4			8.8	
Progression Factor		1.00						0.87			1.45	
Incremental Delay, d2		37.8						21.3			2.2	
Delay (s)		90.7						32.9			15.0	
Level of Service		F						C			B	
Approach Delay (s)		90.7			0.0			32.9			15.0	
Approach LOS		F			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1005: Ashland Ave. □ W Addison St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	175	566	65	136	507	31	0	354	47	0	616	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.96		1.00	0.89
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1490	2838		1441	2911			1143	835		1250	940
Flt Permitted	0.33	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	515	2838		408	2911			1143	835		1250	940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	192	622	71	149	557	34	0	389	52	0	677	51
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	192	693	0	149	591	0	0	389	52	0	677	51
Confl. Peds. (#/hr)	28		11	11		28			16			49
Confl. Bikes (#/hr)			2			1			1			2
Heavy Vehicles (%)	1%	7%	0%	10%	4%	10%	8%	5%	17%	2%	3%	4%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	50.0	50.0		50.0	50.0			71.0	71.0		71.0	71.0
Effective Green, g (s)	50.0	50.0		50.0	50.0			71.0	71.0		71.0	71.0
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.55	0.55		0.55	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	198	1091		156	1119			624	456		682	513
v/s Ratio Prot		0.24			0.20			0.34			c0.54	
v/s Ratio Perm	c0.37			0.37					0.06			0.05
v/c Ratio	0.97	0.64		0.96	0.53			0.62	0.11		0.99	0.10
Uniform Delay, d1	39.3	32.6		38.9	30.9			20.3	14.3		29.2	14.2
Progression Factor	1.00	1.00		1.00	1.00			0.75	0.87		0.76	0.94
Incremental Delay, d2	54.5	1.2		58.2	0.5			3.9	0.4		24.5	0.2
Delay (s)	93.8	33.8		97.1	31.3			19.2	12.9		46.9	13.5
Level of Service	F	C		F	C			B	B		D	B
Approach Delay (s)		46.8			44.6			18.5			44.5	
Approach LOS		D			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1007: Ashland Ave. □ W Roscoe St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑			↑	↱
Volume (vph)	0	0	0	92	197	64	0	464	0	0	614	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	4.0
Lane Util. Factor					1.00			1.00			1.00	1.00
Frpb, ped/bikes					0.97			1.00			1.00	0.87
Flpb, ped/bikes					0.99			1.00			1.00	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1606			1428			1126	841
Flt Permitted					0.99			1.00			1.00	1.00
Satd. Flow (perm)					1606			1428			1126	841
Peak-hour factor, PHF	0.95	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	101	216	70	0	510	0	0	675	60
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	387	0	0	510	0	0	675	60
Confl. Peds. (#/hr)			13	13		43			18			20
Confl. Bikes (#/hr)			2			1						4
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	6%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								6			48	48
Turn Type				Perm	NA			NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8								6
Actuated Green, G (s)					35.0			87.0			87.0	87.0
Effective Green, g (s)					35.0			87.0			87.0	87.0
Actuated g/C Ratio					0.27			0.67			0.67	0.67
Clearance Time (s)					4.0			4.0			4.0	4.0
Lane Grp Cap (vph)					432			955			753	562
v/s Ratio Prot								0.36			c0.60	
v/s Ratio Perm					0.24							0.07
v/c Ratio					0.90			0.53			0.90	0.11
Uniform Delay, d1					45.7			11.1			17.8	7.7
Progression Factor					1.00			1.21			0.46	0.60
Incremental Delay, d2					23.8			1.4			8.5	0.2
Delay (s)					69.5			14.8			16.6	4.8
Level of Service					E			B			B	A
Approach Delay (s)		0.0			69.5			14.8			15.7	
Approach LOS		A			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c   Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1009: Ashland Ave. □ W School St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	129	280	19	16	10	10	0	457	8	0	564	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			0.99	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.99			0.96			1.00			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1590			1523			1304			1493	
Flt Permitted		0.89			0.80			1.00			1.00	
Satd. Flow (perm)		1429			1247			1304			1493	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	142	308	21	18	11	11	0	502	9	0	620	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	471	0	0	40	0	0	511	0	0	660	0
Confl. Peds. (#/hr)	24		35	35		24			24			33
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	2%	0%	5%	0%	0%	0%	0%	5%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		51.0			51.0			71.0			71.0	
Effective Green, g (s)		51.0			51.0			71.0			71.0	
Actuated g/C Ratio		0.39			0.39			0.55			0.55	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		560			489			712			815	
v/s Ratio Prot								0.39			c0.44	
v/s Ratio Perm		c0.33			0.03							
v/c Ratio		0.84			0.08			0.72			0.81	
Uniform Delay, d1		35.8			24.8			22.0			24.0	
Progression Factor		1.00			1.00			0.60			0.58	
Incremental Delay, d2		14.2			0.3			2.1			3.8	
Delay (s)		50.0			25.1			15.2			17.7	
Level of Service		D			C			B			B	
Approach Delay (s)		50.0			25.1			15.2			17.7	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

Movement	EBL2	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT
Lane Configurations		↑↱				↑↱			↑	↱		↑
Volume (vph)	4	435	105	40	2	285	135	43	595	73	1	513
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	12	11	10	12	11	11	11	11
Total Lost time (s)		5.0				5.0			6.0	6.0		6.0
Lane Util. Factor		0.95				0.95			1.00	1.00		1.00
Frpb, ped/bikes		0.96				0.95			1.00	0.84		1.00
Flpb, ped/bikes		1.00				1.00			1.00	1.00		1.00
Frt		0.96				0.94			1.00	0.85		1.00
Flt Protected		1.00				1.00			1.00	1.00		1.00
Satd. Flow (prot)		2866				2820			1293	916		1535
Flt Permitted		0.95				0.95			1.00	1.00		1.00
Satd. Flow (perm)		2728				2680			1293	916		1535
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	4	478	115	44	2	313	148	47	654	80	1	564
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	641	0	0	0	510	0	0	654	81	0	564
Confl. Peds. (#/hr)			51		51		42			47		
Confl. Bikes (#/hr)			8									
Heavy Vehicles (%)	0%	7%	7%	5%	0%	2%	13%	5%	5%	3%	100%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	3	0	0
Parking (#/hr)									24	24		0
Turn Type	Perm	NA			Perm	NA			NA	Perm		NA
Protected Phases		10				14			2			6
Permitted Phases	10				14					2		
Actuated Green, G (s)		27.0				27.0			61.0	61.0		61.0
Effective Green, g (s)		27.0				27.0			61.0	61.0		61.0
Actuated g/C Ratio		0.21				0.21			0.47	0.47		0.47
Clearance Time (s)		5.0				5.0			6.0	6.0		6.0
Lane Grp Cap (vph)		566				556			606	429		720
v/s Ratio Prot									c0.51			0.37
v/s Ratio Perm		c0.23				0.19				0.09		
v/c Ratio		1.13				0.92			1.08	0.19		0.78
Uniform Delay, d1		51.5				50.4			34.5	20.1		29.0
Progression Factor		1.00				1.00			0.64	0.59		0.46
Incremental Delay, d2		79.9				22.4			54.1	0.7		5.1
Delay (s)		131.4				72.8			76.2	12.6		18.4
Level of Service		F				E			E	B		B
Approach Delay (s)		131.4				72.8			69.2			18.4
Approach LOS		F				E			E			B

Intersection Summary			
HCM 2000 Control Delay	80.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

Movement	SBR	SEL	SET	SER	SER2	NWL2	NWL	NWT	NWR	NWR2
Lane Configurations	↱	↰	↑	↱			↰	↑	↱	
Volume (vph)	24	27	342	111	1	7	16	240	61	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	9	11	11	11	12	9	11	11	11
Total Lost time (s)	6.0	6.0	6.0	6.0			6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frpb, ped/bikes	0.94	1.00	1.00	1.00			1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt	0.85	1.00	1.00	0.85			1.00	1.00	0.85	
Flt Protected	1.00	0.95	1.00	1.00			0.95	1.00	1.00	
Satd. Flow (prot)	1391	1386	1689	1423			1539	1723	1438	
Flt Permitted	1.00	0.31	1.00	1.00			0.16	1.00	1.00	
Satd. Flow (perm)	1391	451	1689	1423			259	1723	1438	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	26	30	376	122	1	8	18	264	67	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	26	30	376	123	0	0	26	264	70	0
Confl. Peds. (#/hr)	26									
Confl. Bikes (#/hr)										
Heavy Vehicles (%)	0%	11%	3%	4%	0%	0%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Turn Type	Perm	Perm	NA	Perm		Perm	Perm	NA	Perm	
Protected Phases			4					8		
Permitted Phases	6	4		4		8	8		8	
Actuated Green, G (s)	61.0	25.0	25.0	25.0			25.0	25.0	25.0	
Effective Green, g (s)	61.0	25.0	25.0	25.0			25.0	25.0	25.0	
Actuated g/C Ratio	0.47	0.19	0.19	0.19			0.19	0.19	0.19	
Clearance Time (s)	6.0	6.0	6.0	6.0			6.0	6.0	6.0	
Lane Grp Cap (vph)	652	86	324	273			49	331	276	
v/s Ratio Prot			c0.22					0.15		
v/s Ratio Perm	0.02	0.07		0.09			0.10		0.05	
v/c Ratio	0.04	0.35	1.16	0.45			0.53	0.80	0.25	
Uniform Delay, d1	18.7	45.5	52.5	46.4			47.2	50.1	44.6	
Progression Factor	0.72	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2	0.1	10.8	101.0	5.3			35.5	17.9	2.2	
Delay (s)	13.5	56.3	153.5	51.7			82.8	68.0	46.8	
Level of Service	B	E	F	D			F	E	D	
Approach Delay (s)			124.3					64.9		
Approach LOS			F					E		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1012: Ashland Ave. □ W Barry Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑			↑↱	
Volume (vph)	0	0	0	146	179	5	0	633	0	0	591	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					1.00			1.00			0.97	
Flpb, ped/bikes					0.98			1.00			1.00	
Frt					1.00			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1919			1333			1220	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1919			1333			1220	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	160	197	5	0	696	0	0	649	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	362	0	0	696	0	0	716	0
Confl. Peds. (#/hr)			19	19		54			130			48
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	7%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								16			30	30
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					31.0			91.0			91.0	
Effective Green, g (s)					31.0			91.0			91.0	
Actuated g/C Ratio					0.24			0.70			0.70	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					457			933			854	
v/s Ratio Prot								0.52			c0.59	
v/s Ratio Perm					0.19							
v/c Ratio					0.79			0.75			0.84	
Uniform Delay, d1					46.5			12.2			14.2	
Progression Factor					1.00			0.31			0.85	
Incremental Delay, d2					13.2			4.2			6.5	
Delay (s)					59.6			8.0			18.6	
Level of Service					E			A			B	
Approach Delay (s)		0.0			59.6			8.0			18.6	
Approach LOS		A			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. □ W Wellington Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	52	141	112	0	0	0	0	524	35	0	568	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.95						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1656						1259			1433	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1656						1259			1433	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	57	155	123	0	0	0	0	576	38	0	624	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	335	0	0	0	0	0	614	0	0	636	0
Confl. Peds. (#/hr)	8		1			8			1			2
Heavy Vehicles (%)	4%	1%	0%	0%	0%	0%	2%	13%	0%	0%	4%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		38.0						84.0			84.0	
Effective Green, g (s)		38.0						84.0			84.0	
Actuated g/C Ratio		0.29						0.65			0.65	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		484						813			925	
v/s Ratio Prot								c0.49			0.44	
v/s Ratio Perm		0.20										
v/c Ratio		0.69						0.76			0.69	
Uniform Delay, d1		40.8						15.9			14.6	
Progression Factor		1.00						1.04			1.06	
Incremental Delay, d2		7.9						0.6			2.2	
Delay (s)		48.7						17.1			17.7	
Level of Service		D						B			B	
Approach Delay (s)		48.7			0.0			17.1			17.7	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	184	733	75	144	480	68	0	602	79	0	995	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.89		1.00	0.66
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1530	2997		1580	3010			716	522		1413	934
Flt Permitted	0.14	1.00		0.16	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	230	2997		266	3010			716	522		1413	934
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	202	805	82	158	527	75	0	662	87	0	1093	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	202	887	0	158	602	0	0	662	87	0	1093	63
Confl. Peds. (#/hr)	44		31	31		44			20			76
Confl. Bikes (#/hr)			5			2			3			1
Heavy Vehicles (%)	4%	4%	3%	1%	2%	3%	0%	7%	10%	4%	1%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								92	92		16	
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	39.0	31.0		30.0	25.0			83.0	83.0		83.0	83.0
Effective Green, g (s)	39.0	31.0		30.0	25.0			83.0	83.0		83.0	83.0
Actuated g/C Ratio	0.30	0.24		0.23	0.19			0.64	0.64		0.64	0.64
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	179	714		111	578			457	333		902	596
v/s Ratio Prot	c0.10	0.30		c0.05	0.20			c0.93			0.77	
v/s Ratio Perm	0.24			c0.27					0.17			0.07
v/c Ratio	1.13	1.24		1.42	1.04			1.45	0.26		1.21	0.11
Uniform Delay, d1	39.9	49.5		49.0	52.5			23.5	10.2		23.5	9.1
Progression Factor	1.00	1.00		1.00	1.00			1.22	1.58		0.80	0.88
Incremental Delay, d2	106.0	120.7		234.8	48.7			203.0	0.2		104.9	0.3
Delay (s)	145.9	170.2		283.8	101.2			231.6	16.3		123.6	8.4
Level of Service	F	F		F	F			F	B		F	A
Approach Delay (s)		165.7			139.1			206.6			117.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	153.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1019: Ashland Ave. □ W Wrightwood Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	205	98	102	128	15	0	634	53	0	677	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.99			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1530			1555			1151			1527	
Flt Permitted		0.95			0.52			1.00			1.00	
Satd. Flow (perm)		1458			829			1151			1527	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	35	225	108	112	141	16	0	697	58	0	744	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	368	0	0	269	0	0	755	0	0	771	0
Confl. Peds. (#/hr)	12		2	2		12			4			3
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	1%	2%	0%	0%	6%	6%	4%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			82.0			82.0	
Effective Green, g (s)		40.0			40.0			82.0			82.0	
Actuated g/C Ratio		0.31			0.31			0.63			0.63	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		448			255			726			963	
v/s Ratio Prot								c0.66			0.50	
v/s Ratio Perm		0.25			c0.32							
v/c Ratio		0.82			1.05			1.04			0.80	
Uniform Delay, d1		41.7			45.0			24.0			17.9	
Progression Factor		1.00			1.00			0.56			0.66	
Incremental Delay, d2		15.5			71.5			39.4			0.7	
Delay (s)		57.2			116.5			52.8			12.4	
Level of Service		E			F			D			B	
Approach Delay (s)		57.2			116.5			52.8			12.4	
Approach LOS		E			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	47.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1023: Ashland Ave. □ W Fullerton Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	124	630	7	164	476	15	0	506	54	0	596	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0		2.0	5.0	5.0		5.0	5.0		5.0	2.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94		1.00	0.92		1.00	0.88
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1475	3034		1505	1631	1288		1431	1115		1535	1157
Flt Permitted	0.19	1.00		0.21	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	295	3034		329	1631	1288		1431	1115		1535	1157
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	136	692	8	180	523	16	0	556	59	0	655	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	136	700	0	180	523	16	0	556	59	0	655	125
Confl. Peds. (#/hr)	20		24	24		20			39			38
Confl. Bikes (#/hr)			5			1			2			3
Heavy Vehicles (%)	8%	5%	0%	2%	3%	0%	0%	7%	6%	9%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	pm+ov
Protected Phases	7	4		3	8			2 10			6	7
Permitted Phases	4			8		8			2 10			6
Actuated Green, G (s)	47.1	41.1		54.0	46.0	46.0		66.0	66.0		63.0	69.0
Effective Green, g (s)	47.1	41.1		54.0	46.0	46.0		64.0	64.0		63.0	69.0
Actuated g/C Ratio	0.36	0.32		0.42	0.35	0.35		0.49	0.49		0.48	0.53
Clearance Time (s)	2.0	5.0		2.0	5.0	5.0					5.0	2.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	161	959		235	577	455		704	548		743	614
v/s Ratio Prot	c0.04	0.23		c0.06	c0.32			c0.39			c0.43	0.01
v/s Ratio Perm	0.27			0.25		0.01			0.05			0.10
v/c Ratio	0.84	0.73		0.77	0.91	0.04		0.79	0.11		0.88	0.20
Uniform Delay, d1	37.8	39.5		27.4	40.0	27.5		27.4	17.7		30.1	16.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.22	0.27		0.98	1.03
Incremental Delay, d2	31.3	4.9		13.8	20.4	0.1		4.7	0.2		8.4	0.1
Delay (s)	69.0	44.4		41.2	60.3	27.6		10.9	5.1		37.9	16.6
Level of Service	E	D		D	E	C		B	A		D	B
Approach Delay (s)		48.4			54.8			10.3			34.5	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

	→	↘	↙	←	↖	↑	↗	↓	↙	↙	↗
Movement	EBT	EBR	WBL2	WBT	WBR	NBT	NBR	SBT	SBR	SBR2	NEL
Lane Configurations	↑↱			↰↱		↱		↱			✕
Volume (vph)	615	176	18	209	46	542	32	731	11	1	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	16
Total Lost time (s)	5.0			5.0		5.0		5.0			
Lane Util. Factor	0.95			0.95		1.00		1.00			
Frpb, ped/bikes	0.99			1.00		1.00		1.00			
Flpb, ped/bikes	1.00			1.00		1.00		1.00			
Frt	0.97			0.97		0.99		1.00			
Flt Protected	1.00			1.00		1.00		1.00			
Satd. Flow (prot)	3166			3046		1425		1481			
Flt Permitted	1.00			0.87		1.00		1.00			
Satd. Flow (perm)	3166			2655		1425		1481			
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.92
Adj. Flow (vph)	676	193	20	230	51	596	35	803	12	1	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	869	0	0	301	0	631	0	816	0	0	0
Confl. Peds. (#/hr)		14			2		4				
Heavy Vehicles (%)	0%	0%	0%	5%	7%	9%	6%	2%	0%	0%	2%
Parking (#/hr)						0		6			
Turn Type	NA		Perm	NA		NA		NA			
Protected Phases	4			8		2		6			10
Permitted Phases			8								
Actuated Green, G (s)	55.0			55.0		65.0		65.0			
Effective Green, g (s)	55.0			55.0		65.0		65.0			
Actuated g/C Ratio	0.42			0.42		0.50		0.50			
Clearance Time (s)	5.0			5.0		5.0		5.0			
Vehicle Extension (s)	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	1339			1123		712		740			
v/s Ratio Prot	c0.27					0.44		c0.55			
v/s Ratio Perm				0.11							
v/c Ratio	0.65			0.27		0.89		1.10			
Uniform Delay, d1	29.8			24.4		29.2		32.5			
Progression Factor	1.00			1.00		1.00		0.65			
Incremental Delay, d2	2.4			0.6		15.2		57.0			
Delay (s)	32.3			25.0		44.4		78.2			
Level of Service	C			C		D		E			
Approach Delay (s)	32.3			25.0		44.4		78.2			0.0
Approach LOS	C			C		D		E			A

Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↱			↑	↱		↑	↱
Volume (vph)	48	226	3	152	263	14	0	551	86	0	671	104
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00			1.00	0.97		1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00			1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.98			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1664	1387		3114			1374	1256		1506	1443
Flt Permitted		0.84	1.00		0.63			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1402	1387		1999			1374	1256		1506	1443
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	53	248	3	167	289	15	0	605	95	0	737	114
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	301	3	0	471	0	0	605	95	0	737	114
Confl. Peds. (#/hr)	4		4	4		4			2			7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	14%	2%	10%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		31.0	31.0		31.0			61.0	61.0		61.0	61.0
Effective Green, g (s)		31.0	31.0		31.0			61.0	61.0		61.0	61.0
Actuated g/C Ratio		0.31	0.31		0.31			0.61	0.61		0.61	0.61
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		434	429		619			838	766		918	880
v/s Ratio Prot								0.44			c0.49	
v/s Ratio Perm		0.21	0.00		c0.24				0.08			0.08
v/c Ratio		0.69	0.01		0.76			0.72	0.12		0.80	0.13
Uniform Delay, d1		30.3	23.9		31.2			13.6	8.2		14.9	8.3
Progression Factor		1.00	1.00		1.00			0.37	0.51		1.00	1.00
Incremental Delay, d2		8.8	0.0		8.6			3.3	0.2		7.4	0.3
Delay (s)		39.1	23.9		39.7			8.4	4.4		22.3	8.6
Level of Service		D	C		D			A	A		C	A
Approach Delay (s)		39.0			39.7			7.8			20.4	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↑	↱		↱			↱	
Volume (vph)	0	581	59	4	118	80	0	567	1	0	824	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0	3.0		4.0			3.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00	0.98		1.00	0.97		1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1647	1323		1943	1438		1506			1550	
Flt Permitted		1.00	1.00		0.86	1.00		1.00			1.00	
Satd. Flow (perm)		1647	1323		1679	1438		1506			1550	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	638	65	4	130	88	0	623	1	0	905	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	638	65	0	134	88	0	624	0	0	908	0
Confl. Peds. (#/hr)	9		10	10		9						
Heavy Vehicles (%)	0%	2%	2%	0%	5%	3%	0%	4%	0%	5%	1%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	custom		NA			NA	
Protected Phases		4			8	1		2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		37.0	37.0		37.0	41.0		48.0			56.0	
Effective Green, g (s)		37.0	37.0		37.0	41.0		48.0			56.0	
Actuated g/C Ratio		0.37	0.37		0.37	0.41		0.48			0.56	
Clearance Time (s)		4.0	4.0		4.0	3.0		4.0			3.0	
Lane Grp Cap (vph)		609	489		621	589		722			868	
v/s Ratio Prot		c0.39				0.01		0.41			c0.59	
v/s Ratio Perm			0.05		0.08	0.06						
v/c Ratio		1.05	0.13		0.22	0.15		0.86			1.05	
Uniform Delay, d1		31.5	20.9		21.6	18.5		23.1			22.0	
Progression Factor		1.00	1.00		1.00	1.00		0.56			1.18	
Incremental Delay, d2		49.5	0.6		0.8	0.5		7.7			36.4	
Delay (s)		81.0	21.4		22.4	19.1		20.6			62.5	
Level of Service		F	C		C	B		C			E	
Approach Delay (s)		75.5			21.1			20.6			62.5	
Approach LOS		E			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	51.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1027: Ashland Ave. □ W Armitage Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰		↰	↱			↑	↱
Volume (vph)	462	408	57	7	197	0	85	261	10	0	492	239
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.98			1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1542	1555			1933		1545	1332			1689	1265
Flt Permitted	0.24	1.00			0.97		0.19	1.00			1.00	1.00
Satd. Flow (perm)	389	1555			1880		317	1332			1689	1265
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	508	448	63	8	216	0	93	287	11	0	541	263
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	508	511	0	0	224	0	93	298	0	0	541	263
Confl. Peds. (#/hr)	11		2	2		11	7		3			7
Heavy Vehicles (%)	7%	6%	4%	14%	5%	0%	7%	16%	0%	11%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)								0				0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA			NA	pm+ov
Protected Phases	7	4			8		5	2			6	7
Permitted Phases	4			8			2					6
Actuated Green, G (s)	44.7	44.7			13.7		46.3	46.3			39.5	67.5
Effective Green, g (s)	44.7	44.7			13.7		46.3	46.3			39.5	67.5
Actuated g/C Ratio	0.45	0.45			0.14		0.46	0.46			0.40	0.68
Clearance Time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	496	695			257		205	616			667	853
v/s Ratio Prot	c0.29	0.33					0.02	c0.22			c0.32	0.09
v/s Ratio Perm	c0.17				0.12		0.19					0.12
v/c Ratio	1.02	0.74			0.87		0.45	0.48			0.81	0.31
Uniform Delay, d1	26.7	22.8			42.3		18.6	18.6			26.9	6.7
Progression Factor	1.00	1.00			1.00		1.16	1.04			1.39	1.06
Incremental Delay, d2	46.7	4.0			26.0		0.1	0.2			3.0	0.1
Delay (s)	73.4	26.8			68.3		21.7	19.6			40.3	7.1
Level of Service	E	C			E		C	B			D	A
Approach Delay (s)		50.0			68.3			20.1			29.5	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1029: Ashland Ave. □ W Cortland St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✣			↑↱			↑↱	
Volume (vph)	0	279	20	100	122	4	0	497	91	0	440	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	0.90		0.99			0.97			0.98	
Flpb, ped/bikes		1.00	1.00		0.98			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.98	
Flt Protected		1.00	1.00		0.98			1.00			1.00	
Satd. Flow (prot)		1667	1308		1581			898			1468	
Flt Permitted		1.00	1.00		0.52			1.00			1.00	
Satd. Flow (perm)		1667	1308		838			898			1468	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	0	307	22	110	134	4	0	546	100	0	484	101
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	307	22	0	248	0	0	646	0	0	585	0
Confl. Peds. (#/hr)	159		27	27		159			52			28
Heavy Vehicles (%)	0%	8%	5%	6%	11%	0%	0%	8%	3%	50%	3%	0%
Parking (#/hr)								64			0	
Turn Type		NA	Perm	pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases			4	8								
Actuated Green, G (s)		31.0	31.0		31.0			60.0			60.0	
Effective Green, g (s)		31.0	31.0		31.0			60.0			60.0	
Actuated g/C Ratio		0.31	0.31		0.31			0.60			0.60	
Clearance Time (s)		5.0	5.0		5.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		516	405		259			538			880	
v/s Ratio Prot		0.18						c0.72			0.40	
v/s Ratio Perm			0.02		c0.30							
v/c Ratio		0.59	0.05		0.96			1.20			0.66	
Uniform Delay, d1		29.2	24.2		33.9			20.0			13.3	
Progression Factor		1.00	1.00		1.00			0.58			0.51	
Incremental Delay, d2		5.0	0.3		43.8			105.0			2.7	
Delay (s)		34.2	24.5		77.6			116.5			9.5	
Level of Service		C	C		E			F			A	
Approach Delay (s)		33.5			77.6			116.5			9.5	
Approach LOS		C			E			F			A	

Intersection Summary			
HCM 2000 Control Delay	61.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	34	4	130	24	10	18	0	483	6	0	401	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.90			0.95			1.00			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1397			1103			1228			1513	
Flt Permitted		0.93			0.83			1.00			1.00	
Satd. Flow (perm)		1317			940			1228			1513	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	37	4	143	26	11	20	0	531	7	0	441	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	184	0	0	57	0	0	538	0	0	450	0
Confl. Peds. (#/hr)	1		20	20		1			4			1
Heavy Vehicles (%)	0%	0%	1%	42%	0%	56%	8%	9%	0%	0%	3%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		19.8			19.8			72.2			72.2	
Effective Green, g (s)		19.8			19.8			72.2			72.2	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		260			186			886			1092	
v/s Ratio Prot								c0.44			0.30	
v/s Ratio Perm		c0.14			0.06							
v/c Ratio		0.71			0.31			0.61			0.41	
Uniform Delay, d1		37.4			34.2			6.9			5.5	
Progression Factor		1.00			1.00			0.16			1.14	
Incremental Delay, d2		10.6			2.0			1.5			0.8	
Delay (s)		48.0			36.2			2.6			7.1	
Level of Service		D			D			A			A	
Approach Delay (s)		48.0			36.2			2.6			7.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1033: Ashland Ave. □ W North Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	84	684	33	92	455	19	0	521	88	0	516	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1338	2730		1508	3002			1129	971		1166	910
Flt Permitted	0.32	1.00		0.17	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	452	2730		266	3002			1129	971		1166	910
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	92	752	36	101	500	21	0	573	97	0	567	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	92	788	0	101	521	0	0	573	97	0	567	31
Confl. Peds. (#/hr)			13	13					10			27
Heavy Vehicles (%)	15%	12%	6%	2%	2%	0%	2%	14%	8%	0%	3%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	37.4	31.0		35.8	30.2			52.4	52.4		52.4	52.4
Effective Green, g (s)	37.4	31.0		35.8	30.2			52.4	52.4		52.4	52.4
Actuated g/C Ratio	0.37	0.31		0.36	0.30			0.52	0.52		0.52	0.52
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	225	846		164	906			591	508		610	476
v/s Ratio Prot	c0.03	c0.29		c0.03	0.17			c0.51			0.49	
v/s Ratio Perm	0.13			0.18					0.10			0.03
v/c Ratio	0.41	0.93		0.62	0.58			0.97	0.19		0.93	0.07
Uniform Delay, d1	21.5	33.5		23.6	29.5			23.0	12.6		22.1	11.7
Progression Factor	1.00	1.00		1.00	1.00			1.29	1.33		0.60	0.59
Incremental Delay, d2	1.2	18.2		6.7	2.7			25.8	0.6		21.9	0.2
Delay (s)	22.8	51.7		30.3	32.1			55.4	17.4		35.2	7.2
Level of Service	C	D		C	C			E	B		D	A
Approach Delay (s)		48.6			31.8			49.9			33.7	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1039: Ashland Ave. □ W Blackhawk St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	49	72	11	50	24	44	0	543	30	0	579	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	11	11	11	11	11	11
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.97			1.00			1.00	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.99			0.95			0.99			1.00	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1928			1549			1103			1386	
Flt Permitted		0.87			0.85			1.00			1.00	
Satd. Flow (perm)		1718			1340			1103			1386	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	54	79	12	55	26	48	0	597	33	0	636	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	145	0	0	129	0	0	630	0	0	648	0
Confl. Peds. (#/hr)	24		9	9		24			9			19
Heavy Vehicles (%)	0%	0%	9%	0%	0%	2%	4%	5%	0%	1%	5%	9%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			70.0			70.0	
Effective Green, g (s)		24.0			24.0			70.0			70.0	
Actuated g/C Ratio		0.24			0.24			0.70			0.70	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		412			321			772			970	
v/s Ratio Prot								c0.57			0.47	
v/s Ratio Perm		0.08			c0.10							
v/c Ratio		0.35			0.40			0.82			0.67	
Uniform Delay, d1		31.5			32.0			10.5			8.5	
Progression Factor		1.00			1.00			0.41			0.59	
Incremental Delay, d2		2.4			3.7			8.5			2.2	
Delay (s)		33.9			35.7			12.8			7.2	
Level of Service		C			D			B			A	
Approach Delay (s)		33.9			35.7			12.8			7.2	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↑	↱		↱			↱	
Volume (vph)	13	372	83	0	176	51	0	423	13	0	594	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	11	11	8	11	11	11
Total Lost time (s)	5.0	5.0			5.0	3.0		5.0			5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.93		1.00			1.00	
Flpb, ped/bikes	0.95	1.00			1.00	1.00		1.00			1.00	
Frt	1.00	0.97			1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1522	1601			1642	1252		1593			1520	
Flt Permitted	0.64	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)	1019	1601			1642	1252		1593			1520	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.91	0.91	0.90	0.91	0.91
Adj. Flow (vph)	14	409	91	0	193	56	0	465	14	0	653	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	14	500	0	0	193	56	0	479	0	0	653	0
Confl. Peds. (#/hr)	40		24			40			4			11
Heavy Vehicles (%)	0%	5%	5%	0%	6%	10%	8%	9%	0%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4					3 8						
Actuated Green, G (s)	36.0	36.0			40.0	40.0		50.0			50.0	
Effective Green, g (s)	36.0	36.0			40.0	40.0		50.0			50.0	
Actuated g/C Ratio	0.36	0.36			0.40	0.40		0.50			0.50	
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)	366	576			656	500		796			760	
v/s Ratio Prot		c0.31			c0.12			0.30			c0.43	
v/s Ratio Perm	0.01					0.04						
v/c Ratio	0.04	0.87			0.29	0.11		0.60			0.86	
Uniform Delay, d1	20.8	29.8			20.4	18.8		17.9			21.9	
Progression Factor	1.00	1.00			1.00	1.00		0.58			1.14	
Incremental Delay, d2	0.2	16.2			1.1	0.5		2.2			10.2	
Delay (s)	21.0	45.9			21.5	19.3		12.6			35.2	
Level of Service	C	D			C	B		B			D	
Approach Delay (s)		45.3			21.0			12.6			35.2	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	131	706	54	141	442	42	0	525	141	0	454	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.83	1.00	1.00	0.79		1.00	0.82		1.00	0.87
Flpb, ped/bikes	0.90	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1459	3179	1200	1631	3160	1124		1395	1149		1550	1147
Flt Permitted	0.48	1.00	1.00	0.15	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	729	3179	1200	253	3160	1124		1395	1149		1550	1147
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.93	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	144	776	59	155	486	46	0	577	155	0	499	124
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	144	776	59	155	486	46	0	577	155	0	499	124
Confl. Peds. (#/hr)	102		77	77		102			145			102
Confl. Bikes (#/hr)			7			1			1			1
Heavy Vehicles (%)	2%	4%	2%	1%	1%	0%	7%	6%	6%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.0	29.0	29.0	39.0	39.0	39.0		51.0	51.0		51.0	51.0
Effective Green, g (s)	29.0	29.0	29.0	39.0	39.0	39.0		51.0	51.0		51.0	51.0
Actuated g/C Ratio	0.29	0.29	0.29	0.39	0.39	0.39		0.51	0.51		0.51	0.51
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	211	921	348	195	1232	438		711	585		790	584
v/s Ratio Prot		0.24		c0.06	0.15			c0.41			0.32	
v/s Ratio Perm	0.20		0.05	c0.25		0.04			0.13			0.11
v/c Ratio	0.68	0.84	0.17	0.79	0.39	0.11		0.81	0.26		0.63	0.21
Uniform Delay, d1	31.4	33.4	26.5	22.9	22.0	19.4		20.5	13.9		17.7	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.04	1.05		0.23	0.27
Incremental Delay, d2	16.4	9.3	1.1	27.5	0.9	0.5		8.9	1.0		1.9	0.4
Delay (s)	47.9	42.6	27.6	50.5	22.9	19.9		30.3	15.5		5.9	4.1
Level of Service	D	D	C	D	C	B		C	B		A	A
Approach Delay (s)		42.5			28.9			27.2			5.6	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1049: Ashland Ave. □ W Augusta Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	170	476	52	50	247	29	0	402	118	0	494	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.90		1.00	0.91		1.00	0.96
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1523	1740	1400	1480	1647	1083		1243	1320		1255	1404
Flt Permitted	0.44	1.00	1.00	0.14	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	711	1740	1400	222	1647	1083		1243	1320		1255	1404
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	187	523	57	55	271	32	0	442	130	0	543	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	187	523	57	55	271	32	0	442	130	0	543	91
Confl. Peds. (#/hr)	34		6	6		34			20			6
Heavy Vehicles (%)	0%	0%	2%	4%	2%	14%	0%	12%	2%	2%	4%	1%
Parking (#/hr)								20			30	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.3	34.3	34.3	34.3	34.3	34.3		59.7	59.7		59.7	59.7
Effective Green, g (s)	34.3	34.3	34.3	34.3	34.3	34.3		59.7	59.7		59.7	59.7
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.60	0.60		0.60	0.60
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	243	596	480	76	564	371		742	788		749	838
v/s Ratio Prot		c0.30			0.16			0.36			c0.43	
v/s Ratio Perm	0.26		0.04	0.25		0.03			0.10			0.06
v/c Ratio	0.77	0.88	0.12	0.72	0.48	0.09		0.60	0.16		0.72	0.11
Uniform Delay, d1	29.3	30.9	22.5	28.7	25.8	22.2		12.6	9.0		14.3	8.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.82	0.77
Incremental Delay, d2	13.6	13.7	0.1	28.6	0.6	0.1		3.5	0.5		5.2	0.2
Delay (s)	43.0	44.6	22.6	57.3	26.5	22.3		16.1	9.5		16.9	6.9
Level of Service	D	D	C	E	C	C		B	A		B	A
Approach Delay (s)		42.6			30.9			14.6			15.4	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1056: Ashland Ave. □ W Chicago Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	137	584	67	43	453	19	0	403	71	0	551	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.96		1.00	0.94
Flpb, ped/bikes	1.00	1.00		0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1588	3127		1598	3221			1389	1380		1550	1395
Flt Permitted	0.39	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	657	3127		448	3221			1389	1380		1550	1395
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	151	642	74	47	498	21	0	443	78	0	605	112
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	151	716	0	47	519	0	0	443	78	0	605	112
Confl. Peds. (#/hr)	2		103	103		2			37			61
Heavy Vehicles (%)	4%	3%	1%	0%	2%	0%	0%	4%	3%	1%	1%	0%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	23.5	23.5		23.5	23.5			33.5	33.5		33.5	33.5
Effective Green, g (s)	23.5	23.5		23.5	23.5			33.5	33.5		33.5	33.5
Actuated g/C Ratio	0.36	0.36		0.36	0.36			0.52	0.52		0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	237	1130		161	1164			715	711		798	718
v/s Ratio Prot		0.23			0.16			0.32			c0.39	
v/s Ratio Perm	c0.23			0.10					0.06			0.08
v/c Ratio	0.64	0.63		0.29	0.45			0.62	0.11		0.76	0.16
Uniform Delay, d1	17.2	17.2		14.8	15.8			11.2	8.1		12.5	8.3
Progression Factor	1.00	1.00		1.00	1.00			0.80	0.62		1.00	1.00
Incremental Delay, d2	5.5	1.2		1.0	0.3			3.1	0.2		6.7	0.5
Delay (s)	22.7	18.4		15.8	16.1			12.0	5.3		19.2	8.8
Level of Service	C	B		B	B			B	A		B	A
Approach Delay (s)		19.1			16.0			11.0			17.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	43	56	26	12	17	19	0	517	9	0	579	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.97			0.95			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1539			1471			1379			1427	
Flt Permitted		0.89			0.93			1.00			1.00	
Satd. Flow (perm)		1394			1382			1379			1427	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	47	62	29	13	19	21	0	568	10	0	636	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	138	0	0	53	0	0	578	0	0	644	0
Confl. Peds. (#/hr)	15		12	12		15			10			3
Heavy Vehicles (%)	2%	4%	0%	0%	0%	11%	0%	7%	0%	2%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			39.0			39.0	
Effective Green, g (s)		18.0			18.0			39.0			39.0	
Actuated g/C Ratio		0.28			0.28			0.60			0.60	
Clearance Time (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		386			382			827			856	
v/s Ratio Prot								0.42			c0.45	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.36			0.14			0.70			0.75	
Uniform Delay, d1		18.9			17.7			9.0			9.5	
Progression Factor		1.00			1.00			0.74			0.79	
Incremental Delay, d2		2.6			0.8			3.4			5.2	
Delay (s)		21.4			18.4			10.1			12.7	
Level of Service		C			B			B			B	
Approach Delay (s)		21.4			18.4			10.1			12.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1066: Ashland Ave. □ W Grand Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	98	837	179	64	423	35	0	488	69	0	475	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.97		1.00	0.91
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1510	2876		1457	2915			1325	1337		1535	1179
Flt Permitted	0.40	1.00		0.18	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	643	2876		281	2915			1325	1337		1535	1179
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	108	920	197	70	465	38	0	536	76	0	522	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	108	1117	0	70	503	0	0	536	76	0	522	52
Confl. Peds. (#/hr)	41		61	61		41			16			58
Heavy Vehicles (%)	5%	6%	5%	8%	8%	6%	10%	9%	7%	3%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	30.6	29.6		21.8	21.8			27.4	27.4		27.4	27.4
Effective Green, g (s)	30.6	29.6		21.8	21.8			27.4	27.4		27.4	27.4
Actuated g/C Ratio	0.47	0.46		0.34	0.34			0.42	0.42		0.42	0.42
Clearance Time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	366	1309		94	977			558	563		647	496
v/s Ratio Prot	0.02	c0.39			0.17			c0.40			0.34	
v/s Ratio Perm	0.12			0.25					0.06			0.04
v/c Ratio	0.30	0.85		0.74	0.51			0.96	0.13		0.81	0.10
Uniform Delay, d1	12.9	15.8		19.1	17.4			18.3	11.5		16.5	11.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.82	0.57
Incremental Delay, d2	0.5	7.2		41.1	1.9			29.5	0.5		7.7	0.3
Delay (s)	13.3	23.0		60.3	19.3			47.8	12.0		21.1	6.8
Level of Service	B	C		E	B			D	B		C	A
Approach Delay (s)		22.1			24.3			43.3			19.8	
Approach LOS		C			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. □ W Fulton St. (West)

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↑	↱	
Volume (vph)	48	29	0	466	498	77
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.95			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.95			1.00	0.98	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1231			1450	1468	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1231			1450	1468	
Peak-hour factor, PHF	0.91	0.91	0.97	0.91	0.91	0.91
Adj. Flow (vph)	53	32	0	512	547	85
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	85	0	0	512	632	0
Confl. Peds. (#/hr)	23	12				
Heavy Vehicles (%)	29%	14%	21%	8%	5%	3%
Parking (#/hr)				0	0	
Turn Type	NA			NA	NA	
Protected Phases	4			2 10	6	
Permitted Phases						
Actuated Green, G (s)	16.0			78.0	70.0	
Effective Green, g (s)	16.0			78.0	70.0	
Actuated g/C Ratio	0.16			0.78	0.70	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	196			1131	1027	
v/s Ratio Prot	c0.07			c0.35	c0.43	
v/s Ratio Perm						
v/c Ratio	0.43			0.45	0.62	
Uniform Delay, d1	37.9			3.7	7.9	
Progression Factor	1.00			0.09	1.00	
Incremental Delay, d2	6.8			1.1	2.8	
Delay (s)	44.8			1.4	10.7	
Level of Service	D			A	B	
Approach Delay (s)	44.8			1.4	10.7	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1074: Ashland Ave. □ W Fulton St. (East)

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↑
Volume (vph)	10	15	466	67	0	510
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	11	11	11	11
Total Lost time (s)	3.0		3.0			3.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.85		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		0.98			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1043		1429			1425
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	1043		1429			1425
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.99	0.91
Adj. Flow (vph)	11	16	512	74	0	560
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	27	0	586	0	0	560
Confl. Peds. (#/hr)	12	23				
Heavy Vehicles (%)	30%	20%	8%	6%	0%	5%
Parking (#/hr)			0			8
Turn Type	NA		NA			NA
Protected Phases	8		2			6 14
Permitted Phases						
Actuated Green, G (s)	16.0		70.0			78.0
Effective Green, g (s)	16.0		70.0			78.0
Actuated g/C Ratio	0.16		0.70			0.78
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	166		1000			1111
v/s Ratio Prot	c0.03		c0.41			c0.39
v/s Ratio Perm						
v/c Ratio	0.16		0.59			0.50
Uniform Delay, d1	36.2		7.6			4.0
Progression Factor	1.00		0.68			0.16
Incremental Delay, d2	2.1		1.5			1.3
Delay (s)	38.3		6.7			1.9
Level of Service	D		A			A
Approach Delay (s)	38.3		6.7			1.9
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↑	↱
Volume (vph)	37	280	37	6	158	42	0	490	33	0	513	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			0.99			1.00	0.69
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.99			1.00	0.85
Flt Protected		0.99			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1625			1602			1131			1689	915
Flt Permitted		0.95			0.99			1.00			1.00	1.00
Satd. Flow (perm)		1553			1584			1131			1689	915
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.93	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	41	308	41	7	174	46	0	538	36	0	564	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	390	0	0	227	0	0	574	0	0	564	16
Confl. Peds. (#/hr)	10		36	36		10			34			77
Confl. Bikes (#/hr)			3						2			6
Heavy Vehicles (%)	14%	7%	3%	67%	6%	7%	0%	9%	6%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA			NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8								6
Actuated Green, G (s)		30.0			30.0			62.0			62.0	62.0
Effective Green, g (s)		30.0			30.0			62.0			62.0	62.0
Actuated g/C Ratio		0.30			0.30			0.62			0.62	0.62
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		465			475			701			1047	567
v/s Ratio Prot								c0.51			0.33	
v/s Ratio Perm		c0.25			0.14							0.02
v/c Ratio		0.84			0.48			0.82			0.54	0.03
Uniform Delay, d1		32.7			28.6			14.7			10.8	7.3
Progression Factor		1.00			1.00			0.46			0.47	0.62
Incremental Delay, d2		16.4			3.4			9.8			1.8	0.1
Delay (s)		49.2			32.0			16.5			6.9	4.7
Level of Service		D			C			B			A	A
Approach Delay (s)		49.2			32.0			16.5			6.9	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1079: Ashland Ave. □ W Washington Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑↑			↑↱	
Volume (vph)	0	0	0	8	139	10	0	640	0	0	558	106
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00		0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.96		1.00			0.98	
Flpb, ped/bikes				0.99	1.00	1.00		1.00			1.00	
Frt				1.00	1.00	0.85		1.00			0.98	
Flt Protected				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)				1588	3192	1242		2935			2704	
Flt Permitted				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (perm)				1588	3192	1242		2935			2704	
Peak-hour factor, PHF	0.91	0.97	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	0	0	0	9	153	11	0	703	0	0	613	116
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	9	153	11	0	703	0	0	729	0
Confl. Peds. (#/hr)			4	4		23			27			56
Confl. Bikes (#/hr)			1			2						3
Heavy Vehicles (%)	9%	0%	0%	0%	0%	10%	3%	7%	0%	0%	4%	2%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				27.0	27.0	27.0		65.0			65.0	
Effective Green, g (s)				27.0	27.0	27.0		65.0			65.0	
Actuated g/C Ratio				0.27	0.27	0.27		0.65			0.65	
Clearance Time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)				428	861	335		1907			1757	
v/s Ratio Prot					c0.05			0.24			c0.27	
v/s Ratio Perm				0.01		0.01						
v/c Ratio				0.02	0.18	0.03		0.37			0.41	
Uniform Delay, d1				26.8	28.0	26.9		8.1			8.4	
Progression Factor				1.00	1.00	1.00		0.44			0.70	
Incremental Delay, d2				0.1	0.5	0.2		0.5			0.7	
Delay (s)				26.9	28.4	27.1		4.1			6.5	
Level of Service				C	C	C		A			A	
Approach Delay (s)		0.0			28.3			4.1			6.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1080: Ashland Ave. □ W Warren Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↑↱			↑↑	
Volume (vph)	108	278	42	0	0	0	0	530	65	0	464	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						0.95			0.95	
Frpb, ped/bikes		1.00						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.98			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		2873						2591			2589	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		2873						2591			2589	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	119	305	46	0	0	0	0	582	71	0	510	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	470	0	0	0	0	0	653	0	0	510	0
Confl. Peds. (#/hr)	3		5			3			29			32
Confl. Bikes (#/hr)			4						2			2
Heavy Vehicles (%)	7%	3%	2%	0%	0%	0%	0%	7%	3%	3%	4%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		37.0						55.0			55.0	
Effective Green, g (s)		37.0						55.0			55.0	
Actuated g/C Ratio		0.37						0.55			0.55	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1063						1425			1423	
v/s Ratio Prot								c0.25			0.20	
v/s Ratio Perm		0.16										
v/c Ratio		0.44						0.46			0.36	
Uniform Delay, d1		23.7						13.5			12.6	
Progression Factor		1.00						0.71			0.51	
Incremental Delay, d2		1.3						1.0			0.7	
Delay (s)		25.1						10.6			7.1	
Level of Service		C						B			A	
Approach Delay (s)		25.1			0.0			10.6			7.1	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1082: Ashland Ave. □ W Madison St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	48	324	39	20	218	73	0	407	3	0	556	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.96			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1513	2864		1569	2800			2906			3023	
Flt Permitted	0.53	1.00		0.46	1.00			1.00			1.00	
Satd. Flow (perm)	838	2864		762	2800			2906			3023	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	53	356	43	22	240	80	0	447	3	0	611	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	53	399	0	22	320	0	0	450	0	0	635	0
Confl. Peds. (#/hr)	16		23	23		16			17			25
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	4%	9%	10%	0%	10%	5%	17%	8%	0%	5%	3%	5%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8								
Actuated Green, G (s)	33.0	33.0		45.0	43.0			49.0			49.0	
Effective Green, g (s)	33.0	33.0		45.0	43.0			49.0			49.0	
Actuated g/C Ratio	0.33	0.33		0.45	0.43			0.49			0.49	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	276	945		342	1204			1423			1481	
v/s Ratio Prot		c0.14			c0.11			0.15			c0.21	
v/s Ratio Perm	0.06			0.03								
v/c Ratio	0.19	0.42		0.06	0.27			0.32			0.43	
Uniform Delay, d1	24.0	26.1		15.6	18.3			15.4			16.5	
Progression Factor	1.00	1.00		1.00	1.00			0.50			0.43	
Incremental Delay, d2	1.5	1.4		0.4	0.5			0.4			0.9	
Delay (s)	25.5	27.5		15.9	18.9			8.1			8.0	
Level of Service	C	C		B	B			A			A	
Approach Delay (s)		27.2			18.7			8.1			8.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	160	558	0	250	568	1	0	320	185	0	405	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1628	3288		1588	3143			2835			2897	
Flt Permitted	0.38	1.00		0.36	1.00			1.00			1.00	
Satd. Flow (perm)	646	3288		598	3143			2835			2897	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	176	613	0	275	624	1	0	352	203	0	445	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	176	613	0	275	625	0	0	555	0	0	570	0
Confl. Peds. (#/hr)	1		5	5		1			15			20
Confl. Bikes (#/hr)			3									2
Heavy Vehicles (%)	5%	4%	0%	4%	5%	100%	0%	9%	9%	0%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	3	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	47.0	47.0		64.0	63.0			29.0			29.0	
Effective Green, g (s)	47.0	47.0		64.0	63.0			29.0			29.0	
Actuated g/C Ratio	0.47	0.47		0.64	0.63			0.29			0.29	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	303	1545		511	1980			822			840	
v/s Ratio Prot		0.19		c0.07	0.20			0.20			c0.20	
v/s Ratio Perm	c0.27			0.27								
v/c Ratio	0.58	0.40		0.54	0.32			0.68			0.68	
Uniform Delay, d1	19.3	17.3		15.6	8.5			31.3			31.4	
Progression Factor	1.00	1.00		1.00	1.00			0.91			0.97	
Incremental Delay, d2	7.9	0.8		4.0	0.4			4.1			4.1	
Delay (s)	27.2	18.0		19.6	9.0			32.7			34.6	
Level of Service	C	B		B	A			C			C	
Approach Delay (s)		20.1			12.2			32.7			34.6	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✢			✢			↑↱			↑↱	
Volume (vph)	0	72	31	46	20	21	0	636	50	0	497	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.97			0.99			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1561			1439			2672			3019	
Flt Permitted		1.00			0.82			1.00			1.00	
Satd. Flow (perm)		1561			1210			2672			3019	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	79	34	51	22	23	0	699	55	0	546	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	113	0	0	96	0	0	754	0	0	547	0
Confl. Peds. (#/hr)	5		15	15		5			39			16
Confl. Bikes (#/hr)			2			1			1			
Heavy Vehicles (%)	0%	3%	0%	9%	10%	5%	0%	8%	2%	1%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.0			28.0			64.0			64.0	
Effective Green, g (s)		28.0			28.0			64.0			64.0	
Actuated g/C Ratio		0.28			0.28			0.64			0.64	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		437			338			1710			1932	
v/s Ratio Prot		0.07						c0.28			0.18	
v/s Ratio Perm					c0.08							
v/c Ratio		0.26			0.28			0.44			0.28	
Uniform Delay, d1		27.9			28.2			9.0			7.9	
Progression Factor		1.00			1.00			0.41			0.48	
Incremental Delay, d2		1.4			2.1			0.7			0.3	
Delay (s)		29.4			30.3			4.5			4.1	
Level of Service		C			C			A			A	
Approach Delay (s)		29.4			30.3			4.5			4.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1085: Ashland Ave. □ W Adams St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↱			↑↱			↑↱	
Volume (vph)	0	0	0	202	140	145	0	538	0	0	493	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.96			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					2717			2495			2858	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					2717			2495			2858	
Peak-hour factor, PHF	0.91	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	222	154	159	0	591	0	0	542	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	535	0	0	591	0	0	578	0
Confl. Peds. (#/hr)			53	53		32			25			45
Confl. Bikes (#/hr)			1			1			2			3
Heavy Vehicles (%)	6%	0%	0%	5%	6%	3%	0%	8%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								54			12	12
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					42.0			50.0			50.0	
Effective Green, g (s)					42.0			50.0			50.0	
Actuated g/C Ratio					0.42			0.50			0.50	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1141			1247			1429	
v/s Ratio Prot								c0.24			0.20	
v/s Ratio Perm					0.20							
v/c Ratio					0.47			0.47			0.40	
Uniform Delay, d1					20.9			16.4			15.7	
Progression Factor					1.00			0.12			0.50	
Incremental Delay, d2					1.4			1.2			0.8	
Delay (s)					22.3			3.2			8.6	
Level of Service					C			A			A	
Approach Delay (s)		0.0			22.3			3.2			8.6	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1086: Ashland Ave. □ W Jackson Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱			↑↑	
Volume (vph)	34	166	88	0	0	0	0	498	52	0	496	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0			4.0	
Lane Util. Factor		0.95	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.97					1.00			1.00	
Flpb, ped/bikes		1.00	1.00					1.00			1.00	
Frt		1.00	0.85					0.99			1.00	
Flt Protected		0.99	1.00					1.00			1.00	
Satd. Flow (prot)		3217	1455					2966			2781	
Flt Permitted		0.99	1.00					1.00			1.00	
Satd. Flow (perm)		3217	1455					2966			2781	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.88	0.91	0.92	0.91	0.91	0.88	0.91	0.91
Adj. Flow (vph)	37	182	97	0	0	0	0	547	57	0	545	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	219	97	0	0	0	0	604	0	0	545	0
Confl. Peds. (#/hr)	12		16			12			9			17
Heavy Vehicles (%)	6%	5%	2%	2%	0%	0%	2%	10%	6%	4%	7%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4		4									
Actuated Green, G (s)		36.0	36.0					55.0			55.0	
Effective Green, g (s)		36.0	36.0					55.0			55.0	
Actuated g/C Ratio		0.36	0.36					0.55			0.55	
Clearance Time (s)		5.0	5.0					4.0			4.0	
Lane Grp Cap (vph)		1158	523					1631			1529	
v/s Ratio Prot								c0.20			0.20	
v/s Ratio Perm		0.07	0.07									
v/c Ratio		0.19	0.19					0.37			0.36	
Uniform Delay, d1		22.0	21.9					12.7			12.6	
Progression Factor		1.00	1.00					0.33			0.85	
Incremental Delay, d2		0.4	0.8					0.5			0.6	
Delay (s)		22.3	22.7					4.7			11.3	
Level of Service		C	C					A			B	
Approach Delay (s)		22.5			0.0			4.7			11.3	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↑	↱	↰	↰↑			↑↱	
Volume (vph)	0	0	0	748	288	193	405	502	0	0	645	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				0.97	1.00	1.00	0.91	0.91			0.95	
Frpb, ped/bikes				1.00	1.00	0.96	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	1.00	1.00	0.95	0.99			1.00	
Satd. Flow (prot)				3175	1657	1353	1446	2735			2891	
Flt Permitted				0.95	1.00	1.00	0.95	0.67			1.00	
Satd. Flow (perm)				3175	1657	1353	1446	1857			2891	
Peak-hour factor, PHF	0.91	0.99	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	0	0	0	822	316	212	445	552	0	0	709	137
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	822	316	212	325	672	0	0	846	0
Confl. Peds. (#/hr)			2	2		19	13		9			13
Confl. Bikes (#/hr)						1			2			2
Heavy Vehicles (%)	7%	0%	0%	1%	5%	5%	4%	10%	0%	0%	5%	6%
Parking (#/hr)								0			0	
Turn Type				Split	NA	Perm	Prot	NA			NA	
Protected Phases				8	8		5	5 6			6 16	
Permitted Phases						8						
Actuated Green, G (s)				26.0	26.0	26.0	33.0	47.0			29.0	
Effective Green, g (s)				26.0	26.0	26.0	33.0	47.0			27.0	
Actuated g/C Ratio				0.26	0.26	0.26	0.33	0.47			0.27	
Clearance Time (s)				4.0	4.0	4.0	4.0					
Lane Grp Cap (vph)				825	430	351	477	1162			780	
v/s Ratio Prot				c0.26	0.19		c0.22	0.19			c0.29	
v/s Ratio Perm						0.16		0.08				
v/c Ratio				1.00	0.73	0.60	0.68	0.58			1.08	
Uniform Delay, d1				37.0	33.8	32.5	29.0	19.3			36.5	
Progression Factor				1.00	1.00	1.00	0.47	0.47			0.80	
Incremental Delay, d2				30.5	10.7	7.5	3.3	0.9			57.3	
Delay (s)				67.4	44.5	40.0	17.0	9.9			86.5	
Level of Service				E	D	D	B	A			F	
Approach Delay (s)		0.0			57.7			12.2			86.5	
Approach LOS		A			E			B			F	

Intersection Summary			
HCM 2000 Control Delay	51.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1089: Ashland Ave. □ W Congress Pkwy

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱		↰	↑↑	
Volume (vph)	150	172	221	0	0	0	0	808	253	259	880	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0					2.0		4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.96		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3155	1471					2810		1589	3031	
Flt Permitted		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		3155	1471					2810		1589	3031	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	189	243	0	0	0	0	888	278	285	967	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	354	243	0	0	0	0	1166	0	285	967	0
Confl. Peds. (#/hr)			6						3	3		2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	7%	5%	2%	1%	0%	0%	0%	8%	2%	4%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2 12		1	1 2	
Permitted Phases			4									
Actuated Green, G (s)		26.0	26.0					42.0		22.0	42.0	
Effective Green, g (s)		26.0	26.0					42.0		22.0	42.0	
Actuated g/C Ratio		0.26	0.26					0.42		0.22	0.42	
Clearance Time (s)		4.0	4.0							4.0		
Lane Grp Cap (vph)		820	382					1180		349	1273	
v/s Ratio Prot		0.11						c0.41		c0.18	0.32	
v/s Ratio Perm			c0.17									
v/c Ratio		0.43	0.64					0.99		0.82	0.76	
Uniform Delay, d1		30.8	32.8					28.8		37.1	24.7	
Progression Factor		1.00	1.00					0.89		1.06	0.89	
Incremental Delay, d2		1.7	7.9					20.6		2.0	0.4	
Delay (s)		32.5	40.7					46.1		41.4	22.4	
Level of Service		C	D					D		D	C	
Approach Delay (s)		35.8			0.0			46.1			26.7	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1090: Ashland Ave. □ W Harrison St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	174	124	52	100	202	81	0	959	37	0	904	247
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.98			1.00			0.99	
Flpb, ped/bikes	0.99	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.96			0.99			0.97	
Flt Protected	0.95	0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1493	2925		1512	2865			2868			2901	
Flt Permitted	0.43	0.75		0.58	1.00			1.00			1.00	
Satd. Flow (perm)	679	2221		927	2865			2868			2901	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	191	136	57	110	222	89	0	1054	41	0	993	271
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	120	264	0	110	311	0	0	1095	0	0	1264	0
Confl. Peds. (#/hr)	31		71	71		31			41			22
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	2%	0%	0%	7%	0%	0%	8%	8%	3%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA			NA			NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.0	33.0		22.0	22.0			57.0			57.0	
Effective Green, g (s)	33.0	33.0		22.0	22.0			57.0			57.0	
Actuated g/C Ratio	0.33	0.33		0.22	0.22			0.57			0.57	
Clearance Time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	289	789		203	630			1634			1653	
v/s Ratio Prot	c0.03	0.03			0.11			0.38			c0.44	
v/s Ratio Perm	0.10	0.08		c0.12								
v/c Ratio	0.42	0.33		0.54	0.49			0.67			0.76	
Uniform Delay, d1	24.6	25.2		34.5	34.1			15.0			16.4	
Progression Factor	1.00	1.00		1.00	1.00			0.55			0.83	
Incremental Delay, d2	4.4	1.1		10.0	2.8			1.9			2.3	
Delay (s)	29.0	26.4		44.5	36.9			10.2			16.0	
Level of Service	C	C		D	D			B			B	
Approach Delay (s)		27.2			38.9			10.2			16.0	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1091: Ashland Ave. □ W Flourney St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✥			↑↱			↑↱	
Volume (vph)	108	0	14	2	0	11	0	956	3	0	637	299
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.99		0.98			1.00			0.98	
Flpb, ped/bikes	0.98		1.00		1.00			1.00			1.00	
Frt	1.00		0.85		0.88			1.00			0.95	
Flt Protected	0.95		1.00		0.99			1.00			1.00	
Satd. Flow (prot)	3044		1409		1550			2934			2874	
Flt Permitted	0.75		1.00		0.99			1.00			1.00	
Satd. Flow (perm)	2398		1409		1550			2934			2874	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	119	0	15	2	0	12	0	1051	3	0	700	329
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	119	0	15	0	14	0	0	1054	0	0	1029	0
Confl. Peds. (#/hr)	9		1	1		9			21			14
Confl. Bikes (#/hr)									4			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	28.0		28.0		28.0			63.0			63.0	
Effective Green, g (s)	28.0		28.0		28.0			63.0			63.0	
Actuated g/C Ratio	0.28		0.28		0.28			0.63			0.63	
Clearance Time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Grp Cap (vph)	671		394		434			1848			1810	
v/s Ratio Prot								c0.36			0.36	
v/s Ratio Perm	c0.05		0.01		0.01							
v/c Ratio	0.18		0.04		0.03			0.57			0.57	
Uniform Delay, d1	27.3		26.2		26.2			10.7			10.7	
Progression Factor	1.00		1.00		1.00			1.12			0.28	
Incremental Delay, d2	0.6		0.2		0.1			1.1			0.9	
Delay (s)	27.9		26.4		26.3			13.1			3.8	
Level of Service	C		C		C			B			A	
Approach Delay (s)		27.7			26.3			13.1			3.8	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑↱			↑↱	
Volume (vph)	86	16	37	6	28	70	0	902	10	0	563	147
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.95			0.93			1.00			0.98	
Flpb, ped/bikes		0.96			0.99			1.00			1.00	
Frt		0.96			0.91			1.00			0.97	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1429			1411			2876			2821	
Flt Permitted		0.78			0.99			1.00			1.00	
Satd. Flow (perm)		1149			1395			2876			2821	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	95	18	41	7	31	77	0	991	11	0	619	162
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	154	0	0	115	0	0	1002	0	0	781	0
Confl. Peds. (#/hr)	60		129	129		60			39			14
Confl. Bikes (#/hr)			4			6			5			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	8%	20%	0%	6%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.0			30.0			62.0			62.0	
Effective Green, g (s)		30.0			30.0			62.0			62.0	
Actuated g/C Ratio		0.30			0.30			0.62			0.62	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		344			418			1783			1749	
v/s Ratio Prot								c0.35			0.28	
v/s Ratio Perm		c0.13			0.08							
v/c Ratio		0.45			0.28			0.56			0.45	
Uniform Delay, d1		28.3			26.7			11.1			10.0	
Progression Factor		1.00			1.00			1.11			0.26	
Incremental Delay, d2		4.2			1.6			1.2			0.7	
Delay (s)		32.5			28.3			13.5			3.3	
Level of Service		C			C			B			A	
Approach Delay (s)		32.5			28.3			13.5			3.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1093: Ashland Ave. □ W Taylor St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	36	123	37	44	254	68	0	656	95	0	312	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.85		0.98			0.97	
Flpb, ped/bikes	0.92	1.00	1.00	0.98	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.98			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1472	1570	1369	1559	1600	1188		2747			2675	
Flt Permitted	0.46	1.00	1.00	0.65	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	716	1570	1369	1064	1600	1188		2747			2675	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	40	135	41	48	279	75	0	721	104	0	343	211
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	40	135	41	48	279	75	0	825	0	0	554	0
Confl. Peds. (#/hr)	98		20	20		98			23			15
Confl. Bikes (#/hr)			2			5			1			3
Heavy Vehicles (%)	0%	7%	0%	0%	5%	2%	0%	10%	8%	6%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	36.0	36.0	36.0	36.0	36.0	36.0		55.0			55.0	
Effective Green, g (s)	36.0	36.0	36.0	36.0	36.0	36.0		55.0			55.0	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36		0.55			0.55	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Grp Cap (vph)	257	565	492	383	576	427		1510			1471	
v/s Ratio Prot		0.09			c0.17			c0.30			0.21	
v/s Ratio Perm	0.06		0.03	0.05		0.06						
v/c Ratio	0.16	0.24	0.08	0.13	0.48	0.18		0.55			0.38	
Uniform Delay, d1	21.7	22.4	21.1	21.4	24.8	21.9		14.5			12.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.72			0.29	
Incremental Delay, d2	1.3	1.0	0.3	0.7	2.9	0.9		0.6			0.7	
Delay (s)	23.0	23.4	21.4	22.1	27.7	22.8		11.1			4.4	
Level of Service	C	C	C	C	C	C		B			A	
Approach Delay (s)		23.0			26.1			11.1			4.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1094: Ashland Ave. □ W Roosevelt Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	131	862	108	126	1016	259	0	619	115	0	334	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96		1.00	0.93		1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1564	4305		1504	3099	1337		1491	1214		1657	1249
Flt Permitted	0.11	1.00		0.16	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	188	4305		255	3099	1337		1491	1214		1657	1249
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	144	947	119	138	1116	285	0	680	126	0	367	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	144	1066	0	138	1116	285	0	680	126	0	367	91
Confl. Peds. (#/hr)	28		24	24		28			52			29
Confl. Bikes (#/hr)						4			3			1
Heavy Vehicles (%)	2%	4%	4%	6%	3%	2%	5%	5%	1%	3%	5%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	42.0	35.0		42.0	35.0	35.0		45.0	45.0		45.0	45.0
Effective Green, g (s)	42.0	35.0		42.0	35.0	35.0		45.0	45.0		45.0	45.0
Actuated g/C Ratio	0.42	0.35		0.42	0.35	0.35		0.45	0.45		0.45	0.45
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	5.0	3.0		5.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	175	1506		194	1084	467		670	546		745	562
v/s Ratio Prot	c0.06	0.25		0.05	c0.36			c0.46			0.22	
v/s Ratio Perm	0.29			0.25		0.21			0.10			0.07
v/c Ratio	0.82	0.71		0.71	1.03	0.61		1.01	0.23		0.49	0.16
Uniform Delay, d1	22.8	28.1		19.8	32.5	26.9		27.5	16.9		19.4	16.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.72	0.58		0.88	0.96
Incremental Delay, d2	28.3	2.8		14.2	35.2	5.8		34.7	0.8		2.2	0.6
Delay (s)	51.2	30.9		34.0	67.7	32.7		54.6	10.6		19.4	16.3
Level of Service	D	C		C	E	C		D	B		B	B
Approach Delay (s)		33.3			58.2			47.7			18.8	
Approach LOS		C			E			D			B	

Intersection Summary			
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	50	0	35	2	0	1	0	703	2	0	342	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.94			0.95			1.00			0.99	
Flt Protected		0.97			0.97			1.00			1.00	
Satd. Flow (prot)		1507			1624			1448			1464	
Flt Permitted		0.82			0.88			1.00			1.00	
Satd. Flow (perm)		1267			1470			1448			1464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	55	0	38	2	0	1	0	773	2	0	376	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	0	0	3	0	0	775	0	0	401	0
Confl. Peds. (#/hr)	2		7	7		2			8			10
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	6%	0%	8%	0%	6%	0%	4%	8%	50%	0%	6%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		11.3			11.3			80.7			80.7	
Effective Green, g (s)		11.3			11.3			80.7			80.7	
Actuated g/C Ratio		0.11			0.11			0.81			0.81	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		143			166			1168			1181	
v/s Ratio Prot								c0.54			0.27	
v/s Ratio Perm		c0.07			0.00							
v/c Ratio		0.65			0.02			0.66			0.34	
Uniform Delay, d1		42.5			39.4			4.0			2.6	
Progression Factor		1.00			1.00			0.00			0.66	
Incremental Delay, d2		13.4			0.1			1.3			0.7	
Delay (s)		55.8			39.5			1.3			2.3	
Level of Service		E			D			A			A	
Approach Delay (s)		55.8			39.5			1.3			2.3	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	0	0	20	11	0	3	0	758	0	0	298	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.90			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.94			1.00			1.00	
Frt		0.86			0.97			1.00			1.00	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1406			1586			1297			1446	
Flt Permitted		1.00			0.86			1.00			1.00	
Satd. Flow (perm)		1406			1426			1297			1446	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	0	0	22	12	0	3	0	833	0	0	327	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	22	0	0	15	0	0	833	0	0	334	0
Confl. Peds. (#/hr)			30	30					6			9
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	7%	0%	0%	0%	0%	0%	2%	10%	0%	4%	8%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			72.0			72.0	
Effective Green, g (s)		20.0			20.0			72.0			72.0	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		281			285			933			1041	
v/s Ratio Prot		c0.02						c0.64			0.23	
v/s Ratio Perm					0.01							
v/c Ratio		0.08			0.05			0.89			0.32	
Uniform Delay, d1		32.5			32.3			11.0			5.1	
Progression Factor		1.00			1.00			1.00			0.80	
Incremental Delay, d2		0.5			0.4			12.7			0.8	
Delay (s)		33.1			32.7			23.7			4.9	
Level of Service		C			C			C			A	
Approach Delay (s)		33.1			32.7			23.7			4.9	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1103: Ashland Ave. □ W 18th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	67	257	93	68	358	148	0	759	88	0	294	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.74		1.00	0.84		1.00	0.86
Flpb, ped/bikes	0.91	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1393	1600	1245	1501	1585	1039		1289	1115		1254	1065
Flt Permitted	0.19	1.00	1.00	0.37	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	280	1600	1245	586	1585	1039		1289	1115		1254	1065
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	74	282	102	75	393	163	0	834	97	0	323	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	74	282	102	75	393	163	0	834	97	0	323	63
Confl. Peds. (#/hr)	117		28	28		117			43			39
Confl. Bikes (#/hr)			6			3						1
Heavy Vehicles (%)	4%	5%	5%	3%	6%	2%	1%	8%	12%	6%	11%	19%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	23.0	23.0	23.0	23.0	23.0	23.0		56.0	56.0		56.0	56.0
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0		56.0	56.0		56.0	56.0
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26		0.62	0.62		0.62	0.62
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	71	408	318	149	405	265		802	693		780	662
v/s Ratio Prot		0.18			0.25			c0.65			0.26	
v/s Ratio Perm	c0.26		0.08	0.13		0.16			0.09			0.06
v/c Ratio	1.04	0.69	0.32	0.50	0.97	0.62		1.04	0.14		0.41	0.10
Uniform Delay, d1	33.5	30.3	27.2	28.6	33.2	29.6		17.0	7.0		8.7	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.63	0.57		1.00	1.00
Incremental Delay, d2	119.0	9.3	2.6	11.6	37.9	10.2		30.7	0.2		1.6	0.3
Delay (s)	152.5	39.5	29.8	40.3	71.1	39.8		41.4	4.1		10.3	7.1
Level of Service	F	D	C	D	E	D		D	A		B	A
Approach Delay (s)		55.6			59.3			37.5			9.8	
Approach LOS		E			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1105: Ashland Ave. □ W 19th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	58	44	18	43	77	75	0	824	7	0	519	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.93			1.00			0.99	
Flpb, ped/bikes		0.95			0.97			1.00			1.00	
Frt		0.98			0.95			1.00			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1556			1487			1333			1234	
Flt Permitted		0.68			0.92			1.00			1.00	
Satd. Flow (perm)		1085			1380			1333			1234	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	64	48	20	47	85	82	0	905	8	0	570	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	132	0	0	214	0	0	913	0	0	610	0
Confl. Peds. (#/hr)	73		75	75		73			59			40
Confl. Bikes (#/hr)			1			1			1			2
Heavy Vehicles (%)	5%	0%	0%	0%	0%	6%	6%	8%	0%	0%	8%	3%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		19.0			19.0			63.0			63.0	
Effective Green, g (s)		19.0			19.0			63.0			63.0	
Actuated g/C Ratio		0.21			0.21			0.70			0.70	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		229			291			933			863	
v/s Ratio Prot								c0.68			0.49	
v/s Ratio Perm		0.12			c0.16							
v/c Ratio		0.58			0.74			0.98			0.71	
Uniform Delay, d1		31.9			33.2			12.9			8.0	
Progression Factor		1.00			1.00			0.80			0.64	
Incremental Delay, d2		10.2			15.2			18.9			4.7	
Delay (s)		42.0			48.4			29.2			9.8	
Level of Service		D			D			C			A	
Approach Delay (s)		42.0			48.4			29.2			9.8	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1107: Ashland Ave. □ W 21st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	45	176	9	97	132	33	0	669	32	0	535	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		0.99			0.97			1.00			1.00	
Frt		0.99			0.98			0.99			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1702			1582			1287			1317	
Flt Permitted		0.88			0.69			1.00			1.00	
Satd. Flow (perm)		1503			1106			1287			1317	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	49	193	10	107	145	36	0	735	35	0	588	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	252	0	0	288	0	0	770	0	0	612	0
Confl. Peds. (#/hr)	49		88	88		49			32			43
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	9%	1%	0%	4%	3%	13%	0%	7%	3%	2%	10%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			58.0			58.0	
Effective Green, g (s)		24.0			24.0			58.0			58.0	
Actuated g/C Ratio		0.27			0.27			0.64			0.64	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		400			294			829			848	
v/s Ratio Prot								c0.60			0.46	
v/s Ratio Perm		0.17			c0.26							
v/c Ratio		0.63			0.98			0.93			0.72	
Uniform Delay, d1		29.1			32.8			14.2			10.6	
Progression Factor		1.00			1.00			0.52			0.47	
Incremental Delay, d2		4.4			46.8			2.4			4.0	
Delay (s)		33.5			79.5			9.7			9.0	
Level of Service		C			E			A			A	
Approach Delay (s)		33.5			79.5			9.7			9.0	
Approach LOS		C			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↰	↑↱			↰	↑↱		↑	↱	↑	↰	
Volume (vph)	75	349	52	92	92	495	173	604	98	486	130	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	11	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95			1.00	0.95		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	0.92		1.00	0.99	1.00	0.89	
Flpb, ped/bikes	0.90	1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98			1.00	0.96		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00			0.95	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1296	3016			1347	2678		862	721	1402	963	
Flt Permitted	0.29	1.00			0.31	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (perm)	396	3016			433	2678		862	721	1402	963	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	384	57	101	101	544	190	664	108	534	143	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	82	441	0	0	202	734	0	664	108	534	172	0
Confl. Peds. (#/hr)	155						155				50	
Confl. Bikes (#/hr)							5		1		3	
Heavy Vehicles (%)	11%	8%	4%	15%	22%	8%	11%	7%	6%	8%	18%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	3	0
Parking (#/hr)								74	74	6	6	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		NA	Perm	NA	Perm	
Protected Phases		4		3	3	8		2		6		
Permitted Phases	4			8	8				2		6	
Actuated Green, G (s)	21.0	21.0			29.0	29.0		38.0	38.0	38.0	38.0	
Effective Green, g (s)	21.0	21.0			29.0	29.0		38.0	38.0	38.0	38.0	
Actuated g/C Ratio	0.23	0.23			0.32	0.32		0.42	0.42	0.42	0.42	
Clearance Time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	92	703			190	862		363	304	591	406	
v/s Ratio Prot		0.15			c0.06	0.27		c0.77		0.38		
v/s Ratio Perm	0.21				c0.28				0.15		0.18	
v/c Ratio	0.89	0.63			1.06	0.85		1.83	0.36	0.90	0.42	
Uniform Delay, d1	33.4	31.0			30.1	28.5		26.0	17.7	24.3	18.3	
Progression Factor	1.00	1.00			1.00	1.00		0.98	0.95	0.80	0.85	
Incremental Delay, d2	59.6	1.8			83.0	8.1		382.2	2.7	13.0	0.5	
Delay (s)	93.0	32.7			113.1	36.6		407.8	19.5	32.3	16.1	
Level of Service	F	C			F	D		F	B	C	B	
Approach Delay (s)		42.2				53.1		353.5		28.4		
Approach LOS		D				D		F		C		

Intersection Summary			
HCM 2000 Control Delay	127.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NEL	NER	NER2
Lane Configurations			
Volume (vph)	208	204	37
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	11	12	12
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.88	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.85	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1401	2338	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1401	2338	
Peak-hour factor, PHF	0.91	0.91	0.91
Adj. Flow (vph)	229	224	41
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	229	265	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	18%	15%	16%
Bus Blockages (#/hr)	0	0	0
Parking (#/hr)			
Turn Type	NA	Perm	
Protected Phases	9		
Permitted Phases		9	
Actuated Green, G (s)	11.0	11.0	
Effective Green, g (s)	11.0	11.0	
Actuated g/C Ratio	0.12	0.12	
Clearance Time (s)	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	171	285	
v/s Ratio Prot	c0.16		
v/s Ratio Perm		0.11	
v/c Ratio	1.34	0.93	
Uniform Delay, d1	39.5	39.1	
Progression Factor	1.00	1.00	
Incremental Delay, d2	186.6	34.7	
Delay (s)	226.1	73.9	
Level of Service	F	E	
Approach Delay (s)	144.4		
Approach LOS	F		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	2	0	3	2	0	0	0	757	0	0	563	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			1.00			1.00			1.00	
Flpb, ped/bikes		0.99			0.94			1.00			1.00	
Frt		0.92			1.00			1.00			1.00	
Flt Protected		0.98			0.95			1.00			1.00	
Satd. Flow (prot)		1531			807			1596			1672	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1562			850			1596			1672	
Peak-hour factor, PHF	0.91	0.94	0.91	0.91	0.94	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	2	0	3	2	0	0	0	832	0	0	619	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	0	2	0	0	832	0	0	621	0
Confl. Peds. (#/hr)	1		2	2		1			2			1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	100%	0%	0%	14%	9%	0%	25%	4%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		1.6			1.6			78.4			78.4	
Effective Green, g (s)		1.6			1.6			78.4			78.4	
Actuated g/C Ratio		0.02			0.02			0.87			0.87	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		27			15			1390			1456	
v/s Ratio Prot								c0.52			0.37	
v/s Ratio Perm		c0.00			0.00							
v/c Ratio		0.19			0.13			0.60			0.43	
Uniform Delay, d1		43.6			43.5			1.6			1.2	
Progression Factor		1.00			1.00			1.00			0.46	
Incremental Delay, d2		6.8			8.3			1.9			0.4	
Delay (s)		50.4			51.8			3.5			0.9	
Level of Service		D			D			A			A	
Approach Delay (s)		50.4			51.8			3.5			0.9	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑	↱
Volume (vph)	0	1	0	775	645	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)		4.0		5.0	5.0	
Lane Util. Factor		1.00		1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		765		1642	1582	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		765		1642	1582	
Peak-hour factor, PHF	0.91	0.91	0.96	0.91	0.91	0.91
Adj. Flow (vph)	0	1	0	852	709	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	852	709	0
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	100%	50%	6%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	3
Turn Type		Perm		NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4				6
Actuated Green, G (s)		1.3		89.7	89.7	
Effective Green, g (s)		1.3		89.7	89.7	
Actuated g/C Ratio		0.01		0.90	0.90	
Clearance Time (s)		4.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0	
Lane Grp Cap (vph)		9		1472	1419	
v/s Ratio Prot				c0.52	0.45	
v/s Ratio Perm		c0.00				
v/c Ratio		0.11		0.58	0.50	
Uniform Delay, d1		48.8		1.1	1.0	
Progression Factor		1.00		0.56	1.00	
Incremental Delay, d2		5.4		1.0	1.3	
Delay (s)		54.2		1.6	2.2	
Level of Service		D		A	A	
Approach Delay (s)	54.2			1.6	2.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1112: Ashland Ave. □ W Marketplace Access Rd.

8/8/2013

	↗	↘	↖	↑	↓	↙
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations	↰	↱		↑	↱	
Volume (vph)	32	17	0	745	574	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1096	1012		1171	1138	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1096	1012		1171	1138	
Peak-hour factor, PHF	0.91	0.91	0.92	0.91	0.91	0.91
Adj. Flow (vph)	35	19	0	819	631	20
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	35	19	0	819	651	0
Confl. Peds. (#/hr)		1				3
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	56%	47%	29%	4%	7%	39%
Parking (#/hr)				40	38	
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	6.3	6.3		84.7	84.7	
Effective Green, g (s)	6.3	6.3		84.7	84.7	
Actuated g/C Ratio	0.06	0.06		0.85	0.85	
Clearance Time (s)	4.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	69	63		991	963	
v/s Ratio Prot	c0.03			c0.70	0.57	
v/s Ratio Perm		0.02				
v/c Ratio	0.51	0.30		0.83	0.68	
Uniform Delay, d1	45.3	44.7		3.9	2.7	
Progression Factor	1.00	1.00		1.55	0.83	
Incremental Delay, d2	5.8	2.7		4.4	3.4	
Delay (s)	51.1	47.4		10.5	5.7	
Level of Service	D	D		B	A	
Approach Delay (s)	49.8			10.5	5.7	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		✥			↱		↰	↑	↱
Volume (vph)	388	0	187	15	0	15	0	471	15	15	467	182
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Lane Util. Factor	1.00		1.00		1.00			1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00		1.00			1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00		1.00			1.00		0.99	1.00	1.00
Frt	1.00		0.85		0.93			1.00		1.00	1.00	0.85
Flt Protected	0.95		1.00		0.98			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1605		1222		819			1602		820	1611	1352
Flt Permitted	0.95		1.00		0.98			1.00		0.32	1.00	1.00
Satd. Flow (perm)	1605		1222		819			1602		275	1611	1352
Peak-hour factor, PHF	0.91	0.96	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	426	0	205	16	0	16	0	518	16	16	513	200
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	426	0	205	0	32	0	0	534	0	16	513	200
Confl. Peds. (#/hr)									47	47		1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	0%	21%	100%	0%	100%	0%	5%	100%	100%	8%	7%
Turn Type	Split		Perm	Split	NA			NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases			4							6		6
Actuated Green, G (s)	28.0		28.0		4.8			42.8		47.2	47.2	47.2
Effective Green, g (s)	28.0		28.0		4.8			42.8		47.2	47.2	47.2
Actuated g/C Ratio	0.28		0.28		0.05			0.43		0.47	0.47	0.47
Clearance Time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Vehicle Extension (s)	3.0		3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	449		342		39			685		142	760	638
v/s Ratio Prot	c0.27				c0.04			c0.33		0.00	c0.32	
v/s Ratio Perm			0.17							0.05		0.15
v/c Ratio	0.95		0.60		0.82			0.78		0.11	0.68	0.31
Uniform Delay, d1	35.3		31.1		47.2			24.6		15.3	20.5	16.4
Progression Factor	1.00		1.00		1.00			1.08		0.76	0.89	0.87
Incremental Delay, d2	31.4		7.6		76.9			5.5		0.3	4.0	1.1
Delay (s)	66.7		38.7		124.1			32.2		11.9	22.1	15.3
Level of Service	E		D		F			C		B	C	B
Approach Delay (s)		57.6			124.1			32.2			20.0	
Approach LOS		E			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. □ S Archer Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↱			↱	
Volume (vph)	172	1087	24	78	630	77	0	368	131	0	294	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1604	4630		1573	4323			1406			1523	
Flt Permitted	0.25	1.00		0.14	1.00			1.00			1.00	
Satd. Flow (perm)	417	4630		227	4323			1406			1523	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	189	1195	26	86	692	85	0	404	144	0	323	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	189	1221	0	86	777	0	0	548	0	0	389	0
Confl. Peds. (#/hr)	5		32	32		5			27			19
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	3%	2%	8%	5%	4%	4%	100%	7%	5%	7%	12%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	45.6	37.0		39.2	33.6			44.4			44.4	
Effective Green, g (s)	45.6	37.0		39.2	33.6			44.4			44.4	
Actuated g/C Ratio	0.46	0.37		0.39	0.34			0.44			0.44	
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	296	1713		164	1452			624			676	
v/s Ratio Prot	c0.06	c0.26		0.03	0.18			c0.39			0.26	
v/s Ratio Perm	0.23			0.18								
v/c Ratio	0.64	0.71		0.52	0.54			0.88			0.58	
Uniform Delay, d1	17.6	27.0		20.6	26.9			25.3			20.8	
Progression Factor	1.00	1.00		1.00	1.00			0.78			0.85	
Incremental Delay, d2	6.2	1.4		3.0	1.4			15.3			2.7	
Delay (s)	23.8	28.4		23.6	28.3			35.1			20.5	
Level of Service	C	C		C	C			D			C	
Approach Delay (s)		27.8			27.8			35.1			20.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1115: Ashland Ave. □ W Robinson St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑			↳	
Volume (vph)	0	0	0	31	22	9	111	476	16	0	270	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	2.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	
Frpb, ped/bikes					1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes					0.98	1.00	0.99	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.98	
Flt Protected					0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1600	1490	1289	1616			1500	
Flt Permitted					0.97	1.00	0.52	1.00			1.00	
Satd. Flow (perm)					1600	1490	707	1616			1500	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	34	24	10	122	523	18	0	297	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	58	10	122	541	0	0	363	0
Confl. Peds. (#/hr)			5	5		1	17		6			17
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	9%	0%	27%	7%	6%	3%	13%	8%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					7.9	7.9	86.1	84.1			71.1	
Effective Green, g (s)					7.9	7.9	86.1	84.1			71.1	
Actuated g/C Ratio					0.08	0.08	0.86	0.84			0.71	
Clearance Time (s)					4.0	4.0	2.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					126	117	672	1359			1066	
v/s Ratio Prot							0.02	c0.33			0.24	
v/s Ratio Perm					0.04	0.01	0.14					
v/c Ratio					0.46	0.09	0.18	0.40			0.34	
Uniform Delay, d1					44.0	42.7	1.8	1.9			5.5	
Progression Factor					1.00	1.00	0.52	0.56			0.34	
Incremental Delay, d2					2.7	0.3	0.1	0.8			0.7	
Delay (s)					46.7	43.0	1.1	1.9			2.6	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			46.1			1.7			2.6	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1118: Ashland Ave. □ W 33rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			↑			↑	
Volume (vph)	52	45	29	0	0	26	0	367	2	0	245	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99			0.98			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.94			0.86			1.00			1.00	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1706	1675			1279			1010			1343	
Flt Permitted	0.74	1.00			1.00			1.00			1.00	
Satd. Flow (perm)	1326	1675			1279			1010			1343	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.91	0.92	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	57	49	32	0	0	29	0	403	2	0	269	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	57	81	0	0	29	0	0	405	0	0	269	0
Confl. Peds. (#/hr)	1		3			1			3			3
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	2%	2%	19%	2%	12%	0%	14%	14%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	21.0	21.0			21.0			71.0			71.0	
Effective Green, g (s)	21.0	21.0			21.0			71.0			71.0	
Actuated g/C Ratio	0.21	0.21			0.21			0.71			0.71	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	278	351			268			717			953	
v/s Ratio Prot		c0.05			0.02			c0.40			0.20	
v/s Ratio Perm	0.04											
v/c Ratio	0.21	0.23			0.11			0.56			0.28	
Uniform Delay, d1	32.6	32.8			31.9			7.0			5.3	
Progression Factor	1.00	1.00			1.00			0.45			0.44	
Incremental Delay, d2	1.7	1.5			0.8			2.7			0.7	
Delay (s)	34.3	34.3			32.7			5.9			3.1	
Level of Service	C	C			C			A			A	
Approach Delay (s)		34.3			32.7			5.9			3.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1121: Ashland Ave. □ W 35th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱	↱		↑	↱		↑	↱
Volume (vph)	56	267	78	37	145	91	0	419	24	0	241	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97		1.00	0.95		1.00	0.95
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1588	1514	1216	1588	1370	1108		1139	991		1099	1007
Flt Permitted	0.59	1.00	1.00	0.42	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	989	1514	1216	707	1370	1108		1139	991		1099	1007
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	62	293	86	41	159	100	0	460	26	0	265	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	62	293	86	41	169	90	0	460	26	0	265	7
Confl. Peds. (#/hr)	3		4	4		3			8			10
Confl. Bikes (#/hr)						1			2			3
Heavy Vehicles (%)	0%	11%	14%	0%	15%	19%	14%	13%	4%	17%	14%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0		60.0	60.0		60.0	60.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0		60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31		0.60	0.60		0.60	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	306	469	376	219	424	343		683	594		659	604
v/s Ratio Prot		c0.19			0.12			c0.40			0.24	
v/s Ratio Perm	0.06		0.07	0.06		0.08			0.03			0.01
v/c Ratio	0.20	0.62	0.23	0.19	0.40	0.26		0.67	0.04		0.40	0.01
Uniform Delay, d1	25.4	29.5	25.6	25.3	27.2	25.9		13.4	8.2		10.5	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.53	0.64		0.69	0.74
Incremental Delay, d2	1.5	6.2	1.4	1.9	2.8	1.9		4.4	0.1		1.8	0.0
Delay (s)	26.9	35.7	27.0	27.2	29.9	27.8		11.5	5.4		9.1	6.0
Level of Service	C	D	C	C	C	C		B	A		A	A
Approach Delay (s)		32.8			28.9			11.2			9.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1123: Ashland Ave. □ W 37th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✢			✢			↱			↱	
Volume (vph)	34	34	34	10	21	21	0	553	14	0	426	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.95			0.95			1.00			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1550			1290			1419			1407	
Flt Permitted		0.88			0.95			1.00			1.00	
Satd. Flow (perm)		1395			1236			1419			1407	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	37	37	37	11	23	23	0	608	15	0	468	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	57	0	0	623	0	0	486	0
Confl. Peds. (#/hr)	10		2	2		10			2			7
Heavy Vehicles (%)	0%	21%	0%	20%	0%	59%	5%	10%	7%	19%	11%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		14.3			14.3			76.7			76.7	
Effective Green, g (s)		14.3			14.3			76.7			76.7	
Actuated g/C Ratio		0.14			0.14			0.77			0.77	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		199			176			1088			1079	
v/s Ratio Prot								c0.44			0.35	
v/s Ratio Perm		c0.08			0.05							
v/c Ratio		0.56			0.32			0.57			0.45	
Uniform Delay, d1		39.9			38.5			4.8			4.1	
Progression Factor		1.00			1.00			0.98			0.59	
Incremental Delay, d2		5.7			2.2			1.9			1.3	
Delay (s)		45.6			40.7			6.6			3.8	
Level of Service		D			D			A			A	
Approach Delay (s)		45.6			40.7			6.6			3.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1127: Ashland Ave. □ W Pershing Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	28	329	111	108	369	164	0	482	67	0	367	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1450	2926	1345	1333	2875	992		1294	1134		1253	1106
Flt Permitted	0.51	1.00	1.00	0.38	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	784	2926	1345	527	2875	992		1294	1134		1253	1106
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	31	362	122	119	405	180	0	530	74	0	403	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	31	362	122	119	405	180	0	530	74	0	403	20
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	14%	13%	10%	24%	15%	46%	1%	21%	16%	16%	25%	17%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.8	26.2	26.2	39.2	32.6	32.6		54.8	54.8		54.8	54.8
Effective Green, g (s)	29.8	26.2	26.2	39.2	32.6	32.6		54.8	54.8		54.8	54.8
Actuated g/C Ratio	0.30	0.26	0.26	0.39	0.33	0.33		0.55	0.55		0.55	0.55
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	257	766	352	287	937	323		709	621		686	606
v/s Ratio Prot	0.00	0.12		c0.04	0.14			c0.41			0.32	
v/s Ratio Perm	0.03		0.09	0.12		c0.18			0.07			0.02
v/c Ratio	0.12	0.47	0.35	0.41	0.43	0.56		0.75	0.12		0.59	0.03
Uniform Delay, d1	25.2	31.1	30.0	20.7	26.4	27.8		17.3	10.9		15.1	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.73	0.70		0.91	0.97
Incremental Delay, d2	0.2	2.1	2.7	1.0	1.5	6.8		6.5	0.4		1.2	0.0
Delay (s)	25.4	33.2	32.6	21.7	27.9	34.5		19.1	8.0		14.9	10.1
Level of Service	C	C	C	C	C	C		B	A		B	B
Approach Delay (s)		32.6			28.5			17.8			14.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1130: Ashland Ave. □ W 42nd St. (West)

8/8/2013

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↳	
Volume (vph)	80	33	0	520	308	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	11	11	11	11
Total Lost time (s)	5.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.96			1.00	0.98	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1529			1198	1563	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1529			1198	1563	
Peak-hour factor, PHF	0.91	0.91	0.96	0.91	0.91	0.91
Adj. Flow (vph)	88	36	0	571	338	44
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	124	0	0	571	382	0
Confl. Peds. (#/hr)	2	1				4
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	12%	0%	6%	8%	18%
Parking (#/hr)				34		
Turn Type	NA			NA	NA	
Protected Phases	4			2 9	6	
Permitted Phases						
Actuated Green, G (s)	14.5			75.5	68.5	
Effective Green, g (s)	14.5			75.5	68.5	
Actuated g/C Ratio	0.14			0.76	0.68	
Clearance Time (s)	5.0				3.0	
Vehicle Extension (s)	8.0				3.0	
Lane Grp Cap (vph)	221			904	1070	
v/s Ratio Prot	c0.08			c0.48	0.24	
v/s Ratio Perm						
v/c Ratio	0.56			0.63	0.36	
Uniform Delay, d1	39.8			5.7	6.6	
Progression Factor	1.00			0.08	0.94	
Incremental Delay, d2	9.2			1.1	0.9	
Delay (s)	49.0			1.6	7.0	
Level of Service	D			A	A	
Approach Delay (s)	49.0			1.6	7.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1131: Ashland Ave. □ W 42nd Pl.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑			↱	
Volume (vph)	8	2	5	2	3	2	0	589	0	0	497	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.96			1.00			0.99	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1578			1493			1477			1401	
Flt Permitted		0.88			0.95			1.00			1.00	
Satd. Flow (perm)		1436			1441			1477			1401	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	9	2	5	2	3	2	0	647	0	0	546	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	16	0	0	7	0	0	647	0	0	575	0
Confl. Peds. (#/hr)									5			13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	50%	0%	0%	0%	50%	2%	6%	0%	67%	10%	23%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6 13	
Permitted Phases	4			8								
Actuated Green, G (s)		14.5			14.5			68.5			75.5	
Effective Green, g (s)		14.5			14.5			68.5			75.5	
Actuated g/C Ratio		0.14			0.14			0.68			0.76	
Clearance Time (s)		5.0			5.0			3.0				
Vehicle Extension (s)		8.0			8.0			3.0				
Lane Grp Cap (vph)		208			208			1011			1057	
v/s Ratio Prot								c0.44			c0.41	
v/s Ratio Perm		c0.01			0.00							
v/c Ratio		0.08			0.03			0.64			0.54	
Uniform Delay, d1		37.0			36.7			8.8			5.1	
Progression Factor		1.00			1.00			0.75			0.67	
Incremental Delay, d2		0.7			0.3			2.5			0.6	
Delay (s)		37.6			37.0			9.2			4.0	
Level of Service		D			D			A			A	
Approach Delay (s)		37.6			37.0			9.2			4.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1132: Ashland Ave. □ W 43rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	106	248	56	24	115	66	0	459	42	0	277	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98		1.00	0.98		1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1503	1423		1457	1527	1247		1272	986		1176	886
Flt Permitted	0.68	1.00		0.40	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	1070	1423		616	1527	1247		1272	986		1176	886
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	116	273	62	26	126	73	0	504	46	0	304	80
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	116	335	0	26	126	73	0	504	46	0	304	80
Confl. Peds. (#/hr)	1		14	14		1			1			8
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	16%	4%	8%	10%	12%	3%	4%	10%	22%	8%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	35.0	35.0		35.0	35.0	35.0		56.0	56.0		56.0	56.0
Effective Green, g (s)	35.0	35.0		35.0	35.0	35.0		56.0	56.0		56.0	56.0
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35		0.56	0.56		0.56	0.56
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	374	498		215	534	436		712	552		658	496
v/s Ratio Prot		c0.24			0.08			c0.40			0.26	
v/s Ratio Perm	0.11			0.04		0.06			0.05			0.09
v/c Ratio	0.31	0.67		0.12	0.24	0.17		0.71	0.08		0.46	0.16
Uniform Delay, d1	23.7	27.6		22.1	23.0	22.4		16.0	10.2		13.1	10.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.60	0.78		0.49	0.54
Incremental Delay, d2	2.1	7.1		1.1	1.0	0.8		4.7	0.2		2.0	0.6
Delay (s)	25.8	34.7		23.2	24.1	23.3		14.4	8.2		8.4	6.4
Level of Service	C	C		C	C	C		B	A		A	A
Approach Delay (s)		32.4			23.7			13.9			8.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	38	15	20	13	9	0	582	43	0	400	39
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.97			1.00			1.00			1.00	
Frt		0.98			0.97			0.99			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1616			1457			1347			1074	
Flt Permitted		0.87			0.82			1.00			1.00	
Satd. Flow (perm)		1437			1221			1347			1074	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	35	42	16	22	14	10	0	640	47	0	440	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	0	0	46	0	0	687	0	0	483	0
Confl. Peds. (#/hr)	16		2	2		16			2			9
Heavy Vehicles (%)	0%	5%	7%	10%	0%	44%	14%	5%	2%	10%	10%	10%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		10.6			10.6			80.4			80.4	
Effective Green, g (s)		10.6			10.6			80.4			80.4	
Actuated g/C Ratio		0.11			0.11			0.80			0.80	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		152			129			1082			863	
v/s Ratio Prot								c0.51			0.45	
v/s Ratio Perm		c0.06			0.04							
v/c Ratio		0.61			0.36			0.63			0.56	
Uniform Delay, d1		42.7			41.5			3.9			3.5	
Progression Factor		1.00			1.00			0.24			0.67	
Incremental Delay, d2		10.1			3.5			2.3			2.5	
Delay (s)		52.8			45.0			3.3			4.8	
Level of Service		D			D			A			A	
Approach Delay (s)		52.8			45.0			3.3			4.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	36	20	15	16	10	22	0	489	23	0	275	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			0.99	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.97			0.94			0.99			0.98	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1642			1548			1141			1085	
Flt Permitted		0.85			0.91			1.00			1.00	
Satd. Flow (perm)		1423			1429			1141			1085	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	40	22	16	18	11	24	0	537	25	0	302	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	78	0	0	53	0	0	562	0	0	349	0
Confl. Peds. (#/hr)	15		10	10		15			7			9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	0%	0%	7%	12%	0%	0%	10%	6%	4%	0%	11%	0%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			68.0			68.0	
Effective Green, g (s)		23.0			23.0			68.0			68.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		327			328			775			737	
v/s Ratio Prot								c0.49			0.32	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.24			0.16			0.73			0.47	
Uniform Delay, d1		31.4			30.8			10.1			7.6	
Progression Factor		1.00			1.00			0.57			1.01	
Incremental Delay, d2		1.7			1.1			4.7			1.9	
Delay (s)		33.1			31.8			10.5			9.5	
Level of Service		C			C			B			A	
Approach Delay (s)		33.1			31.8			10.5			9.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1135: Ashland Ave. □ W 46th St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	52	10	4	14	38	0	473	27	0	251	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.96			0.99			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.99			0.91			0.99			0.98	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1703			1516			1152			995	
Flt Permitted		0.89			0.99			1.00			1.00	
Satd. Flow (perm)		1549			1501			1152			995	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	35	57	11	4	15	42	0	520	30	0	276	45
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	103	0	0	61	0	0	550	0	0	321	0
Confl. Peds. (#/hr)	13		5	5		13			18			11
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	10%	0%	0%	5%	0%	6%	4%	2%	13%	7%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			72.0			72.0	
Effective Green, g (s)		20.0			20.0			72.0			72.0	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		309			300			829			716	
v/s Ratio Prot								c0.48			0.32	
v/s Ratio Perm		c0.07			0.04							
v/c Ratio		0.33			0.20			0.66			0.45	
Uniform Delay, d1		34.3			33.4			7.5			5.8	
Progression Factor		1.00			1.00			0.63			1.05	
Incremental Delay, d2		2.9			1.5			3.4			1.8	
Delay (s)		37.2			34.9			8.1			7.9	
Level of Service		D			C			A			A	
Approach Delay (s)		37.2			34.9			8.1			7.9	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1136: Ashland Ave. □ W 47th St. □ S. McDowell Ave.

8/8/2013

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	100	293	40	60	256	48	7	361	0	72	192	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.93		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1425	2701		1527	2712			1071	1328		1398	1126
Flt Permitted	0.45	1.00		0.51	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	670	2701		812	2712			1071	1328		1398	1126
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	110	322	44	66	281	53	8	397	0	79	211	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	110	366	0	66	342	0	0	397	79	0	211	65
Confl. Peds. (#/hr)			27	27		51				33		44
Heavy Vehicles (%)	12%	16%	8%	3%	12%	15%	0%	4%	0%	4%	12%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								52			0	0
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	35.7	28.8		31.5	26.7			54.4	54.4		54.4	54.4
Effective Green, g (s)	35.7	28.8		31.5	26.7			54.4	54.4		54.4	54.4
Actuated g/C Ratio	0.36	0.29		0.32	0.27			0.54	0.54		0.54	0.54
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	291	777		290	724			582	722		760	612
v/s Ratio Prot	c0.03	c0.14		0.01	0.13			c0.37			0.15	
v/s Ratio Perm	0.11			0.06					0.06			0.06
v/c Ratio	0.38	0.47		0.23	0.47			0.68	0.11		0.28	0.11
Uniform Delay, d1	22.6	29.3		24.5	30.7			16.5	11.1		12.2	11.0
Progression Factor	1.00	1.00		1.00	1.00			0.41	0.29		0.60	0.67
Incremental Delay, d2	0.8	2.0		0.4	2.2			4.0	0.2		0.8	0.3
Delay (s)	23.4	31.4		24.9	32.9			10.8	3.4		8.2	7.7
Level of Service	C	C		C	C			B	A		A	A
Approach Delay (s)		29.5			31.7			9.6			8.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SWR2
Lane Configurations	↱
Volume (vph)	3
Ideal Flow (vphpl)	1800
Lane Width	12
Total Lost time (s)	5.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	1557
Flt Permitted	1.00
Satd. Flow (perm)	1557
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	3
RTOR Reduction (vph)	0
Lane Group Flow (vph)	3
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	26.7
Effective Green, g (s)	26.7
Actuated g/C Ratio	0.27
Clearance Time (s)	5.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	415
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	26.9
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	26.9
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1137: Ashland Ave. □ W 48th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	16	55	16	0	582	0	0	250	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.98	
Flpb, ped/bikes					0.98			1.00			1.00	
Frt					0.97			1.00			0.98	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1594			1205			1014	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1594			1205			1014	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	18	60	18	0	640	0	0	275	57
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	96	0	0	640	0	0	332	0
Confl. Peds. (#/hr)			56	56		33			2			19
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	4%	12%	9%	4%	0%	0%	7%	8%
Parking (#/hr)								36			50	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			68.0			68.0	
Effective Green, g (s)					23.0			68.0			68.0	
Actuated g/C Ratio					0.23			0.68			0.68	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					366			819			689	
v/s Ratio Prot								c0.53			0.33	
v/s Ratio Perm					0.06							
v/c Ratio					0.26			0.78			0.48	
Uniform Delay, d1					31.5			10.9			7.6	
Progression Factor					1.00			0.76			0.65	
Incremental Delay, d2					1.7			6.5			2.3	
Delay (s)					33.3			14.8			7.3	
Level of Service					C			B			A	
Approach Delay (s)		0.0			33.3			14.8			7.3	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1138: Ashland Ave. □ W 49th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	48	40	30	16	19	10	0	410	37	0	197	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.97			0.99			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1697			1634			1112			1029	
Flt Permitted		0.86			0.89			1.00			1.00	
Satd. Flow (perm)		1496			1481			1112			1029	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	53	44	33	18	21	11	0	451	41	0	216	23
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	130	0	0	50	0	0	492	0	0	239	0
Confl. Peds. (#/hr)	5					5			14			4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	12%	0%	0%	0%	5%	0%	0%	9%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			67.0			67.0	
Effective Green, g (s)		24.0			24.0			67.0			67.0	
Actuated g/C Ratio		0.24			0.24			0.67			0.67	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		359			355			745			689	
v/s Ratio Prot								c0.44			0.23	
v/s Ratio Perm		c0.09			0.03							
v/c Ratio		0.36			0.14			0.66			0.35	
Uniform Delay, d1		31.6			29.9			9.8			7.1	
Progression Factor		1.00			1.00			0.59			0.34	
Incremental Delay, d2		2.8			0.8			3.6			1.2	
Delay (s)		34.4			30.7			9.3			3.7	
Level of Service		C			C			A			A	
Approach Delay (s)		34.4			30.7			9.3			3.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1139: Ashland Ave. □ W 50th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	26	34	8	16	18	26	0	450	15	0	211	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.97			1.00			0.99	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.98			0.94			1.00			0.98	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1697			1607			1112			1387	
Flt Permitted		0.88			0.93			1.00			1.00	
Satd. Flow (perm)		1529			1507			1112			1387	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	29	37	9	18	20	29	0	495	16	0	232	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	75	0	0	67	0	0	511	0	0	262	0
Confl. Peds. (#/hr)	19		26	26		19			8			8
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	12%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			68.0			68.0	
Effective Green, g (s)		23.0			23.0			68.0			68.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		351			346			756			943	
v/s Ratio Prot								c0.46			0.19	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.21			0.19			0.68			0.28	
Uniform Delay, d1		31.2			31.0			9.5			6.3	
Progression Factor		1.00			1.00			0.42			0.55	
Incremental Delay, d2		1.4			1.2			4.2			0.7	
Delay (s)		32.6			32.3			8.1			4.2	
Level of Service		C			C			A			A	
Approach Delay (s)		32.6			32.3			8.1			4.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1140: Ashland Ave. □ W 51st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	112	318	29	46	196	55	0	349	40	0	168	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.96		1.00	0.94		1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1519	1556	1259	1510	1585	1287		1154	926		983	867
Flt Permitted	0.56	1.00	1.00	0.40	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	901	1556	1259	636	1585	1287		1154	926		983	867
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	123	349	32	51	215	60	0	384	44	0	185	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	123	349	32	51	215	60	0	384	44	0	185	38
Confl. Peds. (#/hr)	5		12	12		5			14			4
Heavy Vehicles (%)	4%	8%	7%	4%	6%	7%	3%	4%	2%	8%	15%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	37.0	37.0	37.0	37.0	37.0	37.0		54.0	54.0		54.0	54.0
Effective Green, g (s)	37.0	37.0	37.0	37.0	37.0	37.0		54.0	54.0		54.0	54.0
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37		0.54	0.54		0.54	0.54
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	333	575	465	235	586	476		623	500		530	468
v/s Ratio Prot		c0.22			0.14			c0.33			0.19	
v/s Ratio Perm	0.14		0.03	0.08		0.05			0.05			0.04
v/c Ratio	0.37	0.61	0.07	0.22	0.37	0.13		0.62	0.09		0.35	0.08
Uniform Delay, d1	23.0	25.6	20.4	21.6	23.0	20.8		15.9	11.1		13.0	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.17	0.27		0.72	0.70
Incremental Delay, d2	3.1	4.7	0.3	2.1	1.8	0.5		3.7	0.3		1.8	0.3
Delay (s)	26.1	30.3	20.6	23.7	24.7	21.4		6.4	3.3		11.1	8.1
Level of Service	C	C	C	C	C	C		A	A		B	A
Approach Delay (s)		28.7			23.9			6.1			10.6	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1142: Ashland Ave. □ W 53rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	8	9	13	0	451	0	0	196	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.94			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1590			1205			1021	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1590			1205			1021	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	9	10	14	0	496	0	0	215	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	33	0	0	496	0	0	233	0
Confl. Peds. (#/hr)			13	13		2			13			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	8%	0%	4%	0%	20%	11%	12%
Parking (#/hr)								36			48	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			68.0			68.0	
Effective Green, g (s)					23.0			68.0			68.0	
Actuated g/C Ratio					0.23			0.68			0.68	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					365			819			694	
v/s Ratio Prot								c0.41			0.23	
v/s Ratio Perm					0.02							
v/c Ratio					0.09			0.61			0.34	
Uniform Delay, d1					30.3			8.7			6.6	
Progression Factor					1.00			0.23			0.71	
Incremental Delay, d2					0.5			2.7			1.3	
Delay (s)					30.8			4.8			6.0	
Level of Service					C			A			A	
Approach Delay (s)		0.0			30.8			4.8			6.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑			↑	↱
Volume (vph)	0	0	0	138	738	29	0	427	0	0	152	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	11	11	11	11	11	11
Total Lost time (s)				5.0	5.0	5.0		3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes				1.00	1.00	0.89		1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00		1.00			1.00	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1524	3069	1266		1477			1084	970
Flt Permitted				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1524	3069	1266		1477			1084	970
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	152	811	32	0	469	0	0	167	77
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	152	811	32	0	469	0	0	167	77
Confl. Peds. (#/hr)						57			12			14
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	4%	6%	0%	0%	14%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm		NA			NA	Perm
Protected Phases					8			2 5			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				40.0	40.0	40.0		46.0			43.0	43.0
Effective Green, g (s)				40.0	40.0	40.0		46.0			43.0	43.0
Actuated g/C Ratio				0.40	0.40	0.40		0.46			0.43	0.43
Clearance Time (s)				5.0	5.0	5.0					3.0	3.0
Lane Grp Cap (vph)				609	1227	506		679			466	417
v/s Ratio Prot					c0.26			c0.32			0.15	
v/s Ratio Perm				0.10		0.03						0.08
v/c Ratio				0.25	0.66	0.06		0.69			0.36	0.18
Uniform Delay, d1				20.0	24.5	18.5		21.4			19.2	17.6
Progression Factor				1.00	1.00	1.00		0.38			1.09	1.11
Incremental Delay, d2				1.0	2.8	0.2		4.2			2.1	1.0
Delay (s)				21.0	27.3	18.7		12.3			23.0	20.5
Level of Service				C	C	B		B			C	C
Approach Delay (s)		0.0			26.0			12.3			22.2	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1145: Ashland Ave. □ W Garfield Blvd. (EB)

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱					↑	↱		↑	
Volume (vph)	76	936	63	0	0	0	0	376	164	0	254	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0		5.0	
Lane Util. Factor	1.00	0.95	1.00					1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.90					1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1477	3011	1191					1248	1077		1437	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1477	3011	1191					1248	1077		1437	
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	84	1029	69	0	0	0	0	413	180	0	279	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	1029	69	0	0	0	0	413	180	0	279	0
Confl. Peds. (#/hr)	1		48			1			10			6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	6%	8%	0%	0%	0%	0%	6%	2%	4%	9%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			1 6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	40.0	40.0	40.0					42.0	42.0		48.0	
Effective Green, g (s)	40.0	40.0	40.0					42.0	42.0		48.0	
Actuated g/C Ratio	0.40	0.40	0.40					0.42	0.42		0.48	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0			
Lane Grp Cap (vph)	590	1204	476					524	452		689	
v/s Ratio Prot		c0.34						c0.33			c0.19	
v/s Ratio Perm	0.06		0.06						0.17			
v/c Ratio	0.14	0.85	0.14					0.79	0.40		0.40	
Uniform Delay, d1	19.1	27.3	19.1					25.1	20.2		16.8	
Progression Factor	1.00	1.00	1.00					0.92	0.99		1.21	
Incremental Delay, d2	0.5	7.8	0.6					7.5	1.7		1.7	
Delay (s)	19.6	35.2	19.7					30.6	21.8		22.0	
Level of Service	B	D	B					C	C		C	
Approach Delay (s)		33.2			0.0			27.9			22.0	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1148: Ashland Ave. □ W 57th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	22	10	34	0	0	0	0	592	8	0	261	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.97						1.00			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.93						1.00			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1544						1167			1063	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1544						1167			1063	
Peak-hour factor, PHF	0.91	0.91	0.91	0.95	0.95	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	24	11	37	0	0	0	0	651	9	0	287	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	72	0	0	0	0	0	660	0	0	287	0
Confl. Peds. (#/hr)	7		17			7			10			23
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	4%	12%	0%	8%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						68.0			68.0	
Effective Green, g (s)		23.0						68.0			68.0	
Actuated g/C Ratio		0.23						0.68			0.68	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		355						793			722	
v/s Ratio Prot								c0.57			0.27	
v/s Ratio Perm		0.05										
v/c Ratio		0.20						0.83			0.40	
Uniform Delay, d1		31.1						11.8			7.0	
Progression Factor		1.00						0.37			0.92	
Incremental Delay, d2		1.3						7.4			1.5	
Delay (s)		32.4						11.8			8.0	
Level of Service		C						B			A	
Approach Delay (s)		32.4			0.0			11.8			8.0	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1150: Ashland Ave. □ W 59th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	76	302	39	51	273	37	0	505	33	0	245	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.79	1.00	1.00	0.96		1.00	0.98		1.00	0.90
Flpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1432	1527	1070	1493	1615	1266		1288	1099		1437	1089
Flt Permitted	0.41	1.00	1.00	0.36	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	617	1527	1070	573	1615	1266		1288	1099		1437	1089
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	84	332	43	56	300	41	0	555	36	0	269	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	332	43	56	300	41	0	555	36	0	269	36
Confl. Peds. (#/hr)	7		63	63		7			1			25
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	11%	10%	5%	4%	4%	8%	2%	4%	0%	7%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.6	30.6	30.6	34.6	30.6	30.6		53.4	53.4		53.4	53.4
Effective Green, g (s)	34.6	30.6	30.6	34.6	30.6	30.6		53.4	53.4		53.4	53.4
Actuated g/C Ratio	0.35	0.31	0.31	0.35	0.31	0.31		0.53	0.53		0.53	0.53
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	246	467	327	235	494	387		687	586		767	581
v/s Ratio Prot	c0.01	c0.22		0.01	0.19			c0.43			0.19	
v/s Ratio Perm	0.10		0.04	0.07		0.03			0.03			0.03
v/c Ratio	0.34	0.71	0.13	0.24	0.61	0.11		0.81	0.06		0.35	0.06
Uniform Delay, d1	23.3	30.8	25.1	22.8	29.6	24.9		19.1	11.2		13.4	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.65	0.92		0.63	0.68
Incremental Delay, d2	0.8	8.9	0.8	0.5	5.5	0.6		6.1	0.1		1.2	0.2
Delay (s)	24.1	39.7	25.9	23.4	35.0	25.4		18.4	10.4		9.6	7.9
Level of Service	C	D	C	C	D	C		B	B		A	A
Approach Delay (s)		35.5			32.4			18.0			9.4	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1152: Ashland Ave. □ W 61st St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	32	32	85	0	0	0	0	572	45	0	309	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.92						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1749						1232			1015	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1749						1232			1015	
Peak-hour factor, PHF	0.91	0.91	0.91	0.99	0.99	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	35	35	93	0	0	0	0	629	49	0	340	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	163	0	0	0	0	0	678	0	0	340	0
Confl. Peds. (#/hr)	6		7			6			16			24
Heavy Vehicles (%)	19%	0%	0%	0%	0%	0%	0%	3%	2%	14%	8%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						68.0			68.0	
Effective Green, g (s)		23.0						68.0			68.0	
Actuated g/C Ratio		0.23						0.68			0.68	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		402						837			690	
v/s Ratio Prot								c0.55			0.33	
v/s Ratio Perm		0.09										
v/c Ratio		0.41						0.81			0.49	
Uniform Delay, d1		32.7						11.4			7.7	
Progression Factor		1.00						1.00			0.93	
Incremental Delay, d2		3.0						8.4			2.4	
Delay (s)		35.7						19.8			9.6	
Level of Service		D						B			A	
Approach Delay (s)		35.7			0.0			19.8			9.6	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	59	493	83	71	462	44	0	475	60	0	311	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	10	10	12	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00			1.00	0.90		1.00	0.91
Flpb, ped/bikes	0.99	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1488	1527	1178	1457	1580			1673	1145		1626	1208
Flt Permitted	0.31	1.00	1.00	0.32	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	479	1527	1178	488	1580			1673	1145		1626	1208
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	65	542	91	78	508	48	0	522	66	0	342	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	542	91	78	556	0	0	522	66	0	342	49
Confl. Peds. (#/hr)	19		76	76		19			42			37
Heavy Vehicles (%)	14%	10%	9%	6%	5%	0%	5%	4%	3%	2%	7%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0			
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0			27.0	27.0		27.0	27.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0			27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48			0.42	0.42		0.42	0.42
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	228	728	561	232	753			694	475		675	501
v/s Ratio Prot		c0.35			0.35			c0.31			0.21	
v/s Ratio Perm	0.14		0.08	0.16					0.06			0.04
v/c Ratio	0.29	0.74	0.16	0.34	0.74			0.75	0.14		0.51	0.10
Uniform Delay, d1	10.3	13.8	9.6	10.6	13.7			16.2	11.8		14.1	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.78	0.69		1.00	1.00
Incremental Delay, d2	3.1	6.8	0.6	3.9	6.4			6.1	0.5		2.7	0.4
Delay (s)	13.4	20.6	10.3	14.5	20.1			18.8	8.6		16.8	12.0
Level of Service	B	C	B	B	C			B	A		B	B
Approach Delay (s)		18.6			19.4			17.7			16.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1156: Ashland Ave. □ W 65th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	36	14	56	0	612	0	0	246	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.93			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1710			1422			1141	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1710			1422			1141	
Peak-hour factor, PHF	0.95	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	40	15	62	0	673	0	0	270	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	117	0	0	673	0	0	297	0
Confl. Peds. (#/hr)			22	22		6			27			26
Heavy Vehicles (%)	0%	0%	0%	6%	0%	2%	0%	4%	0%	0%	8%	4%
Parking (#/hr)								10			36	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					8.0			48.0			48.0	
Effective Green, g (s)					8.0			48.0			48.0	
Actuated g/C Ratio					0.12			0.74			0.74	
Clearance Time (s)					5.0			4.0			4.0	
Vehicle Extension (s)					5.0			3.0			3.0	
Lane Grp Cap (vph)					210			1050			842	
v/s Ratio Prot								c0.47			0.26	
v/s Ratio Perm					0.07							
v/c Ratio					0.56			0.64			0.35	
Uniform Delay, d1					26.8			4.2			3.0	
Progression Factor					1.00			1.00			0.27	
Incremental Delay, d2					5.4			3.0			1.1	
Delay (s)					32.2			7.2			1.9	
Level of Service					C			A			A	
Approach Delay (s)		0.0			32.2			7.2			1.9	
Approach LOS		A			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	48.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
1158: Ashland Ave. □ W Marquette Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↱			↱	
Volume (vph)	94	360	40	66	260	63	0	479	25	0	247	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96		1.00			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1532	1663	1373	1490	1631	1349		1223			1082	
Flt Permitted	0.47	1.00	1.00	0.33	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	751	1663	1373	511	1631	1349		1223			1082	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	103	396	44	73	286	69	0	526	27	0	271	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	103	396	44	73	286	69	0	553	0	0	298	0
Confl. Peds. (#/hr)	11		12	12		11			20			18
Heavy Vehicles (%)	0%	1%	0%	3%	3%	2%	0%	0%	0%	10%	7%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.6	30.6	30.6	34.6	30.6	30.6		42.4			42.4	
Effective Green, g (s)	34.6	30.6	30.6	34.6	30.6	30.6		42.4			42.4	
Actuated g/C Ratio	0.38	0.34	0.34	0.38	0.34	0.34		0.47			0.47	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	323	565	466	239	554	458		576			509	
v/s Ratio Prot	c0.01	c0.24		0.01	0.18			c0.45			0.28	
v/s Ratio Perm	0.11		0.03	0.10		0.05						
v/c Ratio	0.32	0.70	0.09	0.31	0.52	0.15		0.96			0.59	
Uniform Delay, d1	18.5	25.7	20.3	18.8	23.8	20.7		23.0			17.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.77			1.00	
Incremental Delay, d2	0.6	7.1	0.4	0.7	3.4	0.7		23.4			4.9	
Delay (s)	19.1	32.8	20.7	19.5	27.2	21.4		41.1			22.2	
Level of Service	B	C	C	B	C	C		D			C	
Approach Delay (s)		29.2			24.9			41.1			22.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑	↱		↑	↱		↑	↱
Volume (vph)	76	357	49	44	197	30	0	439	41	0	275	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.89		1.00	0.91		1.00	0.90
Flpb, ped/bikes		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Frt		0.98			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		3032			1595	1283		1138	1324		1018	1252
Flt Permitted		0.78			0.82	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		2374			1312	1283		1138	1324		1018	1252
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	84	392	54	48	216	33	0	482	45	0	302	56
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	530	0	0	264	33	0	482	45	0	302	56
Confl. Peds. (#/hr)	47		48	48		47			48			32
Heavy Vehicles (%)	0%	6%	0%	0%	9%	3%	6%	4%	2%	4%	6%	6%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)		28.0			28.0	28.0		53.0	53.0		53.0	53.0
Effective Green, g (s)		28.0			28.0	28.0		53.0	53.0		53.0	53.0
Actuated g/C Ratio		0.31			0.31	0.31		0.59	0.59		0.59	0.59
Clearance Time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		738			408	399		670	779		599	737
v/s Ratio Prot								c0.42			0.30	
v/s Ratio Perm		c0.22			0.20	0.03			0.03			0.04
v/c Ratio		0.72			0.65	0.08		0.72	0.06		0.50	0.08
Uniform Delay, d1		27.5			26.7	21.9		13.2	7.9		10.8	8.0
Progression Factor		1.00			1.00	1.00		0.67	0.96		0.58	0.41
Incremental Delay, d2		5.9			7.7	0.4		4.8	0.1		2.8	0.2
Delay (s)		33.4			34.5	22.3		13.6	7.7		9.1	3.4
Level of Service		C			C	C		B	A		A	A
Approach Delay (s)		33.4			33.1			13.1			8.2	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. □ W 71st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	73	326	32	40	322	65	0	526	13	0	263	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.94		1.00			1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1586	1647	1316	1512	1615	1315		1413			1468	
Flt Permitted	0.34	1.00	1.00	0.37	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	568	1647	1316	590	1615	1315		1413			1468	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	80	358	35	44	354	71	0	578	14	0	289	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	80	358	35	44	354	71	0	592	0	0	319	0
Confl. Peds. (#/hr)	24		18	18		24			7			8
Heavy Vehicles (%)	0%	2%	3%	5%	4%	2%	8%	4%	15%	7%	5%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	33.2	29.2	29.2	31.2	28.2	28.2		45.8			45.8	
Effective Green, g (s)	33.2	29.2	29.2	31.2	28.2	28.2		45.8			45.8	
Actuated g/C Ratio	0.37	0.32	0.32	0.35	0.31	0.31		0.51			0.51	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	254	534	426	235	506	412		719			747	
v/s Ratio Prot	c0.01	0.22		0.01	c0.22			c0.42			0.22	
v/s Ratio Perm	0.10		0.03	0.06		0.05						
v/c Ratio	0.31	0.67	0.08	0.19	0.70	0.17		0.82			0.43	
Uniform Delay, d1	19.6	26.2	21.1	20.3	27.2	22.4		18.7			13.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.40			1.28	
Incremental Delay, d2	0.7	6.6	0.4	0.4	7.8	0.9		8.7			1.5	
Delay (s)	20.3	32.8	21.5	20.7	35.0	23.3		16.2			19.2	
Level of Service	C	C	C	C	D	C		B			B	
Approach Delay (s)		29.9			31.9			16.2			19.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↑	↱		↑	↱
Volume (vph)	51	204	29	29	136	39	0	492	15	0	319	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.92		1.00	0.97		1.00	0.91		1.00	0.92
Flpb, ped/bikes		1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1575	1122		1577	1233		1506	1252		1477	1254
Flt Permitted		0.90	1.00		0.91	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1438	1122		1449	1233		1506	1252		1477	1254
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	56	224	32	32	149	43	0	541	16	0	351	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	280	32	0	181	43	0	541	16	0	351	24
Confl. Peds. (#/hr)	7		33	33		7			27			20
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	22%	6%	17%	0%	6%	12%	9%	4%	7%	5%	6%	9%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		31.0	31.0		31.0	31.0		50.0	50.0		50.0	50.0
Effective Green, g (s)		31.0	31.0		31.0	31.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio		0.34	0.34		0.34	0.34		0.56	0.56		0.56	0.56
Clearance Time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		495	386		499	424		836	695		820	696
v/s Ratio Prot								c0.36			0.24	
v/s Ratio Perm		c0.19	0.03		0.12	0.03			0.01			0.02
v/c Ratio		0.57	0.08		0.36	0.10		0.65	0.02		0.43	0.03
Uniform Delay, d1		24.0	19.9		22.1	20.0		13.9	9.0		11.7	9.1
Progression Factor		1.00	1.00		1.00	1.00		0.83	0.68		0.68	0.60
Incremental Delay, d2		4.6	0.4		2.0	0.5		2.7	0.0		1.6	0.1
Delay (s)		28.6	20.3		24.1	20.5		14.1	6.2		9.5	5.6
Level of Service		C	C		C	C		B	A		A	A
Approach Delay (s)		27.8			23.4			13.9			9.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1170: Ashland Ave. □ W 76th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↑↱			↑↱	
Volume (vph)	46	309	17	44	208	53	0	518	39	0	206	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.99			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		3060			3009			1257			1150	
Flt Permitted		0.86			0.83			1.00			1.00	
Satd. Flow (perm)		2647			2526			1257			1150	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	51	340	19	48	229	58	0	569	43	0	226	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	410	0	0	335	0	0	612	0	0	237	0
Confl. Peds. (#/hr)	1		9	9		1			5			2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	3%	6%	0%	2%	4%	0%	4%	5%	7%	7%	0%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			57.0			57.0	
Effective Green, g (s)		24.0			24.0			57.0			57.0	
Actuated g/C Ratio		0.27			0.27			0.63			0.63	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		705			673			796			728	
v/s Ratio Prot								c0.49			0.21	
v/s Ratio Perm		c0.15			0.13							
v/c Ratio		0.58			0.50			0.77			0.33	
Uniform Delay, d1		28.6			27.9			11.8			7.6	
Progression Factor		1.00			1.00			0.61			1.18	
Incremental Delay, d2		3.5			2.6			5.2			1.1	
Delay (s)		32.1			30.5			12.4			10.1	
Level of Service		C			C			B			B	
Approach Delay (s)		32.1			30.5			12.4			10.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	111	496	42	36	454	72	0	412	35	0	233	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.92		1.00	0.88		1.00	0.87
Flpb, ped/bikes	0.98	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1489	1541	1178	1413	1527	1159		1165	890		1143	820
Flt Permitted	0.26	1.00	1.00	0.21	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	407	1541	1178	316	1527	1159		1165	890		1143	820
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	122	545	46	40	499	79	0	453	38	0	256	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	122	545	46	40	499	79	0	453	38	0	256	30
Confl. Peds. (#/hr)	41		54	54		41			41			47
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	1%	9%	5%	6%	10%	9%	7%	6%	3%	10%	5%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	35.0	35.0	35.0	35.0	35.0		39.0	39.0		39.0	39.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0		39.0	39.0		39.0	39.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.43	0.43		0.43	0.43
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	158	599	458	122	593	450		504	385		495	355
v/s Ratio Prot		c0.35			0.33			c0.39			0.22	
v/s Ratio Perm	0.30		0.04	0.13		0.07			0.04			0.04
v/c Ratio	0.77	0.91	0.10	0.33	0.84	0.18		0.90	0.10		0.52	0.08
Uniform Delay, d1	24.0	26.0	17.5	19.3	25.0	18.0		23.7	15.1		18.6	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.48	0.41		0.67	0.58
Incremental Delay, d2	29.9	20.2	0.4	7.0	13.5	0.8		15.4	0.3		3.7	0.4
Delay (s)	53.9	46.2	17.9	26.3	38.5	18.9		26.7	6.5		16.1	9.1
Level of Service	D	D	B	C	D	B		C	A		B	A
Approach Delay (s)		45.7			35.2			25.2			15.4	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1175: Ashland Ave. □ W 81st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	26	92	32	0	527	0	0	190	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)					5.0	5.0		4.0			4.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.96		1.00			0.98	
Flpb, ped/bikes					1.00	1.00		1.00			1.00	
Frt					1.00	0.85		1.00			0.98	
Flt Protected					0.99	1.00		1.00			1.00	
Satd. Flow (prot)					1625	1314		1149			1005	
Flt Permitted					0.99	1.00		1.00			1.00	
Satd. Flow (perm)					1625	1314		1149			1005	
Peak-hour factor, PHF	0.94	0.94	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	0	0	0	29	101	35	0	579	0	0	209	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	130	35	0	579	0	0	242	0
Confl. Peds. (#/hr)			11	11		12			5			41
Heavy Vehicles (%)	0%	0%	0%	8%	0%	4%	3%	3%	0%	0%	5%	3%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					23.0	23.0		58.0			58.0	
Effective Green, g (s)					23.0	23.0		58.0			58.0	
Actuated g/C Ratio					0.26	0.26		0.64			0.64	
Clearance Time (s)					5.0	5.0		4.0			4.0	
Lane Grp Cap (vph)					415	335		740			647	
v/s Ratio Prot								c0.50			0.24	
v/s Ratio Perm					0.08	0.03						
v/c Ratio					0.31	0.10		0.78			0.37	
Uniform Delay, d1					27.1	25.6		11.5			7.5	
Progression Factor					1.00	1.00		0.67			0.94	
Incremental Delay, d2					2.0	0.6		6.3			1.6	
Delay (s)					29.1	26.2		14.0			8.6	
Level of Service					C	C		B			A	
Approach Delay (s)		0.0			28.5			14.0			8.6	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1177: Ashland Ave. □ W 83rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	59	287	71	52	250	39	0	506	49	0	225	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00			1.00	0.94		1.00	0.98
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1512	1647	1370	1547	3076			1301	1053		1061	917
Flt Permitted	0.53	1.00	1.00	0.38	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	836	1647	1370	621	3076			1301	1053		1061	917
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	65	315	78	57	275	43	0	556	54	0	247	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	315	78	57	318	0	0	556	54	0	247	15
Confl. Peds. (#/hr)	3		12	12		3			18			7
Heavy Vehicles (%)	5%	2%	0%	2%	1%	3%	2%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0			55.0	55.0		55.0	55.0
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0			55.0	55.0		55.0	55.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29			0.61	0.61		0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	241	475	395	179	888			795	643		648	560
v/s Ratio Prot		c0.19			0.10			c0.43			0.23	
v/s Ratio Perm	0.08		0.06	0.09					0.05			0.02
v/c Ratio	0.27	0.66	0.20	0.32	0.36			0.70	0.08		0.38	0.03
Uniform Delay, d1	24.7	28.1	24.1	25.1	25.4			11.9	7.2		8.9	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.66	0.73		0.74	0.94
Incremental Delay, d2	2.7	7.1	1.1	4.6	1.1			3.0	0.2		1.6	0.1
Delay (s)	27.4	35.3	25.3	29.7	26.5			10.8	5.4		8.2	6.6
Level of Service	C	D	C	C	C			B	A		A	A
Approach Delay (s)		32.5			27.0			10.4			8.1	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1179: Ashland Ave. □ W 85th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	60	47	31	0	0	0	0	597	55	0	318	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1627						1125			1127	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1627						1125			1127	
Peak-hour factor, PHF	0.91	0.91	0.91	0.90	0.90	0.91	0.90	0.91	0.91	0.90	0.91	0.91
Adj. Flow (vph)	66	52	34	0	0	0	0	656	60	0	349	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	152	0	0	0	0	0	716	0	0	349	0
Confl. Peds. (#/hr)	7		8			7			13			11
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	0%	6%	0%	0%	0%	0%	5%	4%	0%	5%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		11.9						69.1			69.1	
Effective Green, g (s)		11.9						69.1			69.1	
Actuated g/C Ratio		0.13						0.77			0.77	
Clearance Time (s)		5.0						4.0			4.0	
Vehicle Extension (s)		6.0						3.0			3.0	
Lane Grp Cap (vph)		215						863			865	
v/s Ratio Prot								c0.64			0.31	
v/s Ratio Perm		0.09										
v/c Ratio		0.71						0.83			0.40	
Uniform Delay, d1		37.4						6.7			3.5	
Progression Factor		1.00						0.56			0.72	
Incremental Delay, d2		14.6						5.0			1.4	
Delay (s)		51.9						8.8			3.9	
Level of Service		D						A			A	
Approach Delay (s)		51.9			0.0			8.8			3.9	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. □ W 87th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	109	1044	115	59	845	151	0	500	26	0	236	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00	0.92		1.00	0.89		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1504	3210	1229	1548	3179	1215		1226	930		1061	882
Flt Permitted	0.15	1.00	1.00	0.12	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	231	3210	1229	201	3179	1215		1226	930		1061	882
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	120	1147	126	65	929	166	0	549	29	0	259	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	120	1147	126	65	929	166	0	549	29	0	259	33
Confl. Peds. (#/hr)	34		53	53		34			92			16
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	6%	3%	3%	3%	4%	8%	3%	5%	4%	3%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.6	33.6	33.6	37.2	32.4	32.4		39.6	39.6		39.6	39.6
Effective Green, g (s)	39.6	33.6	33.6	37.2	32.4	32.4		39.6	39.6		39.6	39.6
Actuated g/C Ratio	0.44	0.37	0.37	0.41	0.36	0.36		0.44	0.44		0.44	0.44
Clearance Time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	186	1198	458	154	1144	437		539	409		466	388
v/s Ratio Prot	c0.04	c0.36		0.02	0.29			c0.45			0.24	
v/s Ratio Perm	0.24		0.10	0.15		0.14			0.03			0.04
v/c Ratio	0.65	0.96	0.28	0.42	0.81	0.38		1.02	0.07		0.56	0.09
Uniform Delay, d1	17.6	27.5	19.7	19.2	26.0	21.4		25.2	14.6		18.7	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.82	0.83		0.93	0.84
Incremental Delay, d2	7.5	17.6	1.5	1.9	6.3	2.5		35.8	0.2		4.3	0.4
Delay (s)	25.1	45.1	21.2	21.1	32.4	23.9		56.6	12.4		21.8	12.7
Level of Service	C	D	C	C	C	C		E	B		C	B
Approach Delay (s)		41.2			30.5			54.3			20.8	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. □ W 91st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑	↱		↑	↱
Volume (vph)	24	27	24	26	8	53	0	611	13	0	448	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			0.95			1.00	0.95		1.00	0.97
Flpb, ped/bikes		0.99			1.00			1.00	1.00		1.00	1.00
Frt		0.96			0.92			1.00	0.85		1.00	0.85
Flt Protected		0.98			0.99			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1543			1442			1054	1404		1154	1429
Flt Permitted		0.90			0.90			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1404			1324			1054	1404		1154	1429
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	26	30	26	29	9	58	0	671	14	0	492	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	82	0	0	96	0	0	671	14	0	492	8
Confl. Peds. (#/hr)	16		4	4		16			9			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	4%	0%	11%	4%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		12.0			12.0			69.0	69.0		69.0	69.0
Effective Green, g (s)		12.0			12.0			69.0	69.0		69.0	69.0
Actuated g/C Ratio		0.13			0.13			0.77	0.77		0.77	0.77
Clearance Time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		8.0			8.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		187			176			808	1076		884	1095
v/s Ratio Prot								c0.64			0.43	
v/s Ratio Perm		0.06			c0.07				0.01			0.01
v/c Ratio		0.44			0.55			0.83	0.01		0.56	0.01
Uniform Delay, d1		35.9			36.5			6.7	2.5		4.3	2.5
Progression Factor		1.00			1.00			0.73	0.79		0.74	0.77
Incremental Delay, d2		6.9			10.9			7.0	0.0		2.4	0.0
Delay (s)		42.8			47.3			12.0	2.0		5.6	1.9
Level of Service		D			D			B	A		A	A
Approach Delay (s)		42.8			47.3			11.8			5.5	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1191: Ashland Ave. □ W 95th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	178	579	43	62	663	226	0	579	24	0	200	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.93	1.00	0.98			1.00	0.97		1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1533	3149	1372	1497	2945			1520	1271		1520	1155
Flt Permitted	0.12	1.00	1.00	0.32	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	197	3149	1372	506	2945			1520	1271		1520	1155
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	196	636	47	68	729	248	0	636	26	0	220	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	196	636	47	68	977	0	0	636	26	0	220	48
Confl. Peds. (#/hr)	43		37	37		43			26			60
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	5%	0%	6%	5%	8%	2%	3%	0%	4%	3%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	38.8	32.8	32.8	36.4	31.6			39.4	39.4		39.4	39.4
Effective Green, g (s)	38.8	32.8	32.8	36.4	31.6			39.4	39.4		39.4	39.4
Actuated g/C Ratio	0.43	0.36	0.36	0.40	0.35			0.44	0.44		0.44	0.44
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	173	1147	500	257	1034			665	556		665	505
v/s Ratio Prot	c0.08	0.20		0.01	0.33			c0.42			0.14	
v/s Ratio Perm	c0.41		0.03	0.09					0.02			0.04
v/c Ratio	1.13	0.55	0.09	0.26	0.94			0.96	0.05		0.33	0.10
Uniform Delay, d1	21.1	22.8	18.8	17.0	28.4			24.5	14.5		16.6	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	108.6	1.9	0.4	0.6	17.5			25.7	0.2		1.3	0.4
Delay (s)	129.8	24.7	19.2	17.6	45.9			50.2	14.7		18.0	15.2
Level of Service	F	C	B	B	D			D	B		B	B
Approach Delay (s)		47.8			44.0			48.8			17.5	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1001: Ashland Ave. □ W Irving Park Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	206	810	164	124	889	48	0	553	62	0	789	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.84	1.00	0.99			1.00	0.87		1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1580	3160	1172	1546	3133			1253	890		1550	1195
Flt Permitted	0.12	1.00	1.00	0.13	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	200	3160	1172	214	3133			1253	890		1550	1195
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Adj. Flow (vph)	217	853	173	131	936	51	0	582	65	0	831	141
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	217	853	173	131	987	0	0	582	65	0	831	141
Confl. Peds. (#/hr)	72		69	69		72			81			59
Confl. Bikes (#/hr)			5			7			7			6
Heavy Vehicles (%)	1%	1%	2%	3%	0%	4%	2%	0%	3%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								36	36		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	41.2	33.2	33.2	38.8	32.0			57.0	57.0		57.0	57.0
Effective Green, g (s)	41.2	33.2	33.2	38.8	32.0			57.0	57.0		57.0	57.0
Actuated g/C Ratio	0.37	0.30	0.30	0.35	0.29			0.52	0.52		0.52	0.52
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2			0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	175	953	353	157	911			649	461		803	619
v/s Ratio Prot	c0.09	0.27		0.05	0.32			0.46			c0.54	
v/s Ratio Perm	c0.37		0.15	0.24					0.07			0.12
v/c Ratio	1.24	0.90	0.49	0.83	1.08			0.90	0.14		1.03	0.23
Uniform Delay, d1	29.6	36.7	31.5	27.4	39.0			23.9	13.8		26.5	14.5
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.70	0.78		1.00	1.00
Incremental Delay, d2	147.0	10.6	0.4	28.9	55.0			11.5	0.4		41.1	0.9
Delay (s)	176.7	47.3	31.9	56.3	94.0			28.2	11.2		67.6	15.3
Level of Service	F	D	C	E	F			C	B		E	B
Approach Delay (s)		67.7			89.6			26.5			60.0	
Approach LOS		E			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	65.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1003: Ashland Ave. □ W Grace St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	32	76	30	0	0	0	0	639	32	0	751	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1509						1158			1203	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1509						1158			1203	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.97	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	34	80	32	0	0	0	0	673	34	0	791	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	146	0	0	0	0	0	707	0	0	813	0
Confl. Peds. (#/hr)	23		20			23			22			11
Confl. Bikes (#/hr)			1			1			1			3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	3%	2%	5%
Parking (#/hr)								44			38	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		22.0						80.0			80.0	
Effective Green, g (s)		22.0						80.0			80.0	
Actuated g/C Ratio		0.20						0.73			0.73	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		301						842			874	
v/s Ratio Prot								0.61			c0.68	
v/s Ratio Perm		0.10										
v/c Ratio		0.49						0.84			0.93	
Uniform Delay, d1		39.0						10.5			12.6	
Progression Factor		1.00						1.33			1.39	
Incremental Delay, d2		5.5						8.6			9.4	
Delay (s)		44.5						22.6			27.0	
Level of Service		D						C			C	
Approach Delay (s)		44.5			0.0			22.6			27.0	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1005: Ashland Ave. □ W Addison St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	119	596	69	134	493	77	0	408	40	0	633	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.98		1.00	0.95
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1508	2933		1564	2931			1189	1005		1250	1037
Flt Permitted	0.31	1.00		0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	496	2933		414	2931			1189	1005		1250	1037
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	125	627	73	141	519	81	0	429	42	0	666	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	125	700	0	141	600	0	0	429	42	0	666	49
Confl. Peds. (#/hr)	30		19	19		30			2			25
Confl. Bikes (#/hr)			2			7						
Heavy Vehicles (%)	0%	3%	0%	1%	2%	0%	8%	1%	0%	2%	3%	0%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	38.5	38.5		38.5	38.5			62.5	62.5		62.5	62.5
Effective Green, g (s)	38.5	38.5		38.5	38.5			62.5	62.5		62.5	62.5
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.57	0.57		0.57	0.57
Clearance Time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	173	1026		144	1025			675	571		710	589
v/s Ratio Prot		0.24			0.20			0.36			c0.53	
v/s Ratio Perm	0.25			c0.34					0.04			0.05
v/c Ratio	0.72	0.68		0.98	0.59			0.64	0.07		0.94	0.08
Uniform Delay, d1	31.1	30.5		35.4	29.2			16.1	10.7		22.0	10.8
Progression Factor	1.00	1.00		1.00	1.00			0.99	1.10		0.51	0.41
Incremental Delay, d2	13.9	1.9		67.9	0.9			3.9	0.2		10.9	0.1
Delay (s)	45.0	32.4		103.2	30.1			19.8	11.9		22.1	4.5
Level of Service	D	C		F	C			B	B		C	A
Approach Delay (s)		34.3			44.0			19.1			20.9	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↑	↱
Volume (vph)	0	0	0	84	174	82	0	487	0	0	558	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	4.0
Lane Util. Factor					1.00			1.00			1.00	1.00
Frpb, ped/bikes					0.98			1.00			1.00	0.80
Flpb, ped/bikes					0.98			1.00			1.00	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1592			1499			1126	774
Flt Permitted					0.99			1.00			1.00	1.00
Satd. Flow (perm)					1592			1499			1126	774
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	88	183	86	0	513	0	0	587	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	357	0	0	513	0	0	587	48
Confl. Peds. (#/hr)			25	25		26			18			39
Confl. Bikes (#/hr)			1			1			6			5
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								6			48	48
Turn Type				Perm	NA			NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8								6
Actuated Green, G (s)					32.0			70.0			70.0	70.0
Effective Green, g (s)					32.0			70.0			70.0	70.0
Actuated g/C Ratio					0.29			0.64			0.64	0.64
Clearance Time (s)					4.0			4.0			4.0	4.0
Lane Grp Cap (vph)					463			953			716	492
v/s Ratio Prot								0.34			c0.52	
v/s Ratio Perm					0.22							0.06
v/c Ratio					0.77			0.54			0.82	0.10
Uniform Delay, d1					35.7			11.1			15.2	7.8
Progression Factor					1.00			0.89			0.62	0.77
Incremental Delay, d2					11.8			1.4			6.3	0.2
Delay (s)					47.4			11.3			15.7	6.2
Level of Service					D			B			B	A
Approach Delay (s)		0.0			47.4			11.3			15.0	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1009: Ashland Ave. □ W School St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	110	218	33	18	22	25	0	531	22	0	462	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.95			0.99			0.95	
Flpb, ped/bikes		0.97			0.98			1.00			1.00	
Frt		0.99			0.95			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1546			1469			1346			1432	
Flt Permitted		0.88			0.87			1.00			1.00	
Satd. Flow (perm)		1379			1303			1346			1432	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	116	229	35	19	23	26	0	559	23	0	486	55
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	380	0	0	68	0	0	582	0	0	541	0
Confl. Peds. (#/hr)	42		71	71		42			29			139
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	0%	1%	0%	1%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			62.0			62.0	
Effective Green, g (s)		40.0			40.0			62.0			62.0	
Actuated g/C Ratio		0.36			0.36			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		501			473			758			807	
v/s Ratio Prot								c0.43			0.38	
v/s Ratio Perm		c0.28			0.05							
v/c Ratio		0.76			0.14			0.77			0.67	
Uniform Delay, d1		30.8			23.5			18.5			16.8	
Progression Factor		1.00			1.00			0.66			0.63	
Incremental Delay, d2		10.3			0.6			5.2			2.5	
Delay (s)		41.1			24.1			17.4			13.0	
Level of Service		D			C			B			B	
Approach Delay (s)		41.1			24.1			17.4			13.0	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

	→	↘	↘	↙	←	↖	↖	↑	↗	↓	↙	↙
Movement	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↑↱				↑↱			↑	↱	↑	↱	
Volume (vph)	396	57	38	12	366	156	77	561	71	449	35	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	11	10	12	11	11	11	11	11
Total Lost time (s)	5.0				5.0			6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95				0.95			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	0.98				0.93			1.00	0.73	1.00	0.89	
Flpb, ped/bikes	1.00				1.00			1.00	1.00	1.00	1.00	
Frt	0.97				0.94			1.00	0.85	1.00	0.85	
Flt Protected	1.00				1.00			1.00	1.00	1.00	1.00	
Satd. Flow (prot)	3051				2790			1331	831	1506	1314	
Flt Permitted	1.00				0.94			1.00	1.00	1.00	1.00	
Satd. Flow (perm)	3051				2622			1331	831	1506	1314	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	417	60	40	13	385	164	81	591	75	473	37	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	517	0	0	0	643	0	0	591	75	473	41	0
Confl. Peds. (#/hr)		44		44		76			95		63	
Confl. Bikes (#/hr)		5				13			11		6	
Heavy Vehicles (%)	3%	4%	0%	0%	1%	11%	1%	2%	0%	4%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								24	24	0		
Turn Type	NA			Perm	NA			NA	Perm	NA	Perm	
Protected Phases	10				14			2		6		
Permitted Phases				14					2		6	
Actuated Green, G (s)	27.0				27.0			49.0	49.0	49.0	49.0	
Effective Green, g (s)	27.0				27.0			49.0	49.0	49.0	49.0	
Actuated g/C Ratio	0.25				0.25			0.45	0.45	0.45	0.45	
Clearance Time (s)	5.0				5.0			6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	748				643			592	370	670	585	
v/s Ratio Prot	0.17							c0.44		0.31		
v/s Ratio Perm					c0.25				0.09		0.03	
v/c Ratio	0.69				1.00			1.00	0.20	0.71	0.07	
Uniform Delay, d1	37.7				41.5			30.5	18.6	24.7	17.5	
Progression Factor	1.00				1.00			0.64	0.66	0.59	0.78	
Incremental Delay, d2	5.2				35.5			29.4	0.8	4.7	0.2	
Delay (s)	42.9				77.0			49.0	13.0	19.1	13.7	
Level of Service	D				E			D	B	B	B	
Approach Delay (s)	42.9				77.0			45.0		18.7		
Approach LOS	D				E			D		B		

Intersection Summary			
HCM 2000 Control Delay	65.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. □ N. Lincoln Ave. □ W Belmont Ave.

8/8/2013

Movement	SEL2	SEL	SET	SER	SER2	NWL2	NWL	NWT	NWR	NWR2
Lane Configurations		↰	↑	↱			↰	↑	↱	
Volume (vph)	4	53	271	93	12	7	31	279	97	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	11	11	11	12	9	11	11	11
Total Lost time (s)		6.0	6.0	6.0			6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00	1.00			1.00	1.00	1.00	
Frpb, ped/bikes		1.00	1.00	1.00			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00			1.00	1.00	1.00	
Frt		1.00	1.00	0.85			1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1511	1706	1466			1539	1740	1453	
Flt Permitted		0.24	1.00	1.00			0.24	1.00	1.00	
Satd. Flow (perm)		374	1706	1466			381	1740	1453	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	56	285	98	13	7	33	294	102	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	60	285	111	0	0	40	294	110	0
Confl. Peds. (#/hr)										
Confl. Bikes (#/hr)										
Heavy Vehicles (%)	0%	2%	2%	1%	0%	0%	0%	0%	0%	25%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Turn Type	Perm	Perm	NA	Perm		Perm	Perm	NA	Perm	
Protected Phases			4					8		
Permitted Phases	4	4		4		8	8		8	
Actuated Green, G (s)		17.0	17.0	17.0			17.0	17.0	17.0	
Effective Green, g (s)		17.0	17.0	17.0			17.0	17.0	17.0	
Actuated g/C Ratio		0.15	0.15	0.15			0.15	0.15	0.15	
Clearance Time (s)		6.0	6.0	6.0			6.0	6.0	6.0	
Lane Grp Cap (vph)		57	263	226			58	268	224	
v/s Ratio Prot			0.17					c0.17		
v/s Ratio Perm		0.16		0.08			0.10		0.08	
v/c Ratio		1.05	1.08	0.49			0.69	1.10	0.49	
Uniform Delay, d1		46.5	46.5	42.5			44.0	46.5	42.5	
Progression Factor		1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		134.7	79.6	7.4			50.6	83.4	7.5	
Delay (s)		181.2	126.1	50.0			94.6	129.9	50.0	
Level of Service		F	F	D			F	F	D	
Approach Delay (s)			114.8					106.9		
Approach LOS			F					F		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1012: Ashland Ave. □ W Barry Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	129	306	32	0	651	0	0	732	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.98	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1907			1413			1238	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1907			1413			1238	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	136	322	34	0	685	0	0	771	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	492	0	0	685	0	0	820	0
Confl. Peds. (#/hr)			40	40		26			33			56
Confl. Bikes (#/hr)			2			2			2			3
Heavy Vehicles (%)	0%	0%	0%	3%	0%	3%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								16			30	30
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					29.0			73.0			73.0	
Effective Green, g (s)					29.0			73.0			73.0	
Actuated g/C Ratio					0.26			0.66			0.66	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					502			937			821	
v/s Ratio Prot								0.48			c0.66	
v/s Ratio Perm					0.26							
v/c Ratio					0.98			0.73			1.00	
Uniform Delay, d1					40.2			12.1			18.5	
Progression Factor					1.00			0.30			0.84	
Incremental Delay, d2					35.5			2.1			29.0	
Delay (s)					75.7			5.7			44.4	
Level of Service					E			A			D	
Approach Delay (s)		0.0			75.7			5.7			44.4	
Approach LOS		A			E			A			D	

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. □ W Wellington Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↱			↑↱	
Volume (vph)	120	229	107	0	0	0	0	657	68	0	696	75
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			0.99	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.97						0.99			0.99	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1666						1373			1401	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1666						1373			1401	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.96	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	126	241	113	0	0	0	0	692	72	0	733	79
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	480	0	0	0	0	0	764	0	0	812	0
Confl. Peds. (#/hr)	27		8			27			11			22
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	2%	2%	1%	0%	0%	43%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		34.0						68.0			68.0	
Effective Green, g (s)		34.0						68.0			68.0	
Actuated g/C Ratio		0.31						0.62			0.62	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		514						848			866	
v/s Ratio Prot								0.56			c0.58	
v/s Ratio Perm		0.29										
v/c Ratio		0.93						0.90			0.94	
Uniform Delay, d1		36.9						18.1			19.1	
Progression Factor		1.00						0.87			1.00	
Incremental Delay, d2		26.3						1.7			7.2	
Delay (s)		63.2						17.5			26.2	
Level of Service		E						B			C	
Approach Delay (s)		63.2			0.0			17.5			26.2	
Approach LOS		E			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1018: Ashland Ave. □ W Diversey Pkwy.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	168	533	55	170	639	83	0	735	70	0	1014	98
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.91		1.00	0.79
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1577	3058		1561	3043			758	588		1385	1145
Flt Permitted	0.18	1.00		0.17	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	302	3058		286	3043			758	588		1385	1145
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	177	561	58	179	673	87	0	774	74	0	1067	103
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	177	619	0	179	760	0	0	774	74	0	1067	103
Confl. Peds. (#/hr)	29		30	30		29			17			52
Confl. Bikes (#/hr)			12			7			9			8
Heavy Vehicles (%)	1%	2%	0%	2%	2%	1%	0%	1%	0%	4%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								92	92		16	
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	27.0	22.0		29.0	23.0			71.0	71.0		71.0	71.0
Effective Green, g (s)	27.0	22.0		29.0	23.0			71.0	71.0		71.0	71.0
Actuated g/C Ratio	0.25	0.20		0.26	0.21			0.65	0.65		0.65	0.65
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	132	611		144	636			489	379		893	739
v/s Ratio Prot	0.06	0.20		c0.07	0.25			c1.02			0.77	
v/s Ratio Perm	c0.27			0.26					0.13			0.09
v/c Ratio	1.34	1.01		1.24	1.19			1.58	0.20		1.19	0.14
Uniform Delay, d1	40.8	44.0		38.3	43.5			19.5	7.9		19.5	7.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.35	1.07
Incremental Delay, d2	195.5	39.7		154.6	102.6			271.9	1.1		96.3	0.3
Delay (s)	236.3	83.7		192.9	146.1			291.4	9.1		122.5	8.4
Level of Service	F	F		F	F			F	A		F	A
Approach Delay (s)		117.6			155.0			266.8			112.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	159.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.51		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1019: Ashland Ave. □ W Wrightwood Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	54	211	49	96	209	31	0	676	54	0	718	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.99			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1546			1565			1206			1486	
Flt Permitted		0.84			0.68			1.00			1.00	
Satd. Flow (perm)		1307			1075			1206			1486	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	222	52	101	220	33	0	712	57	0	756	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	331	0	0	354	0	0	769	0	0	802	0
Confl. Peds. (#/hr)	9		11	11		9			8			20
Confl. Bikes (#/hr)			3						1			2
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	6%	1%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			82.0			82.0	
Effective Green, g (s)		40.0			40.0			82.0			82.0	
Actuated g/C Ratio		0.31			0.31			0.63			0.63	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		402			330			760			937	
v/s Ratio Prot								c0.64			0.54	
v/s Ratio Perm		0.25			c0.33							
v/c Ratio		0.82			1.07			1.01			0.86	
Uniform Delay, d1		41.7			45.0			24.0			19.3	
Progression Factor		1.00			1.00			0.34			1.00	
Incremental Delay, d2		17.2			70.2			23.3			9.9	
Delay (s)		58.9			115.2			31.3			29.2	
Level of Service		E			F			C			C	
Approach Delay (s)		58.9			115.2			31.3			29.2	
Approach LOS		E			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1023: Ashland Ave. □ W Fullerton Ave.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	148	648	16	96	524	28	0	730	75	0	679	170
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0		2.0	5.0	5.0		5.0	5.0		5.0	2.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93		1.00	0.93		1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1580	3144		1536	1631	1234		1516	1180		1520	1212
Flt Permitted	0.10	1.00		0.22	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	173	3144		350	1631	1234		1516	1180		1520	1212
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	156	682	17	101	552	29	0	768	79	0	715	179
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	156	699	0	101	552	29	0	768	79	0	715	179
Confl. Peds. (#/hr)	21		21	21		21			34			20
Confl. Bikes (#/hr)			9			2			6			
Heavy Vehicles (%)	1%	1%	0%	0%	3%	4%	0%	1%	1%	9%	3%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	pm+ov
Protected Phases	7	4		3	8			2 10			6	7
Permitted Phases	4			8		8			2 10			6
Actuated Green, G (s)	49.8	41.8		52.2	43.0	43.0		67.0	67.0		64.0	72.0
Effective Green, g (s)	49.8	41.8		52.2	43.0	43.0		65.0	65.0		64.0	72.0
Actuated g/C Ratio	0.38	0.32		0.40	0.33	0.33		0.50	0.50		0.49	0.55
Clearance Time (s)	2.0	5.0		2.0	5.0	5.0					5.0	2.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	152	1010		224	539	408		758	590		748	671
v/s Ratio Prot	c0.06	0.22		c0.03	c0.34			c0.51			0.47	0.02
v/s Ratio Perm	0.33			0.15		0.02			0.07			0.13
v/c Ratio	1.03	0.69		0.45	1.02	0.07		1.01	0.13		0.96	0.27
Uniform Delay, d1	34.0	38.5		26.6	43.5	29.8		32.5	17.4		31.6	15.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.49	0.58		1.15	1.19
Incremental Delay, d2	80.1	3.9		1.4	45.0	0.3		19.0	0.1		16.4	0.1
Delay (s)	114.1	42.4		28.0	88.5	30.1		34.9	10.3		52.8	18.2
Level of Service	F	D		C	F	C		C	B		D	B
Approach Delay (s)		55.5			77.1			32.6			45.9	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	51.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1024: Medill Ave. □ Ashland Ave. □ N Clybourn Ave.

8/8/2013

	→	↘	↙	←	↖	↑	↗	↓	↙	↙	↗
Movement	EBT	EBR	WBL2	WBT	WBR	NBT	NBR	SBT	SBR	SBR2	NEL
Lane Configurations	↑↱			↰↱		↱		↱			✥
Volume (vph)	509	209	28	560	157	739	32	687	20	7	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	16
Total Lost time (s)	5.0			5.0		5.0		5.0			
Lane Util. Factor	0.95			0.95		1.00		1.00			
Frpb, ped/bikes	0.98			0.99		1.00		1.00			
Flpb, ped/bikes	1.00			1.00		1.00		1.00			
Frt	0.96			0.97		0.99		0.99			
Flt Protected	1.00			1.00		1.00		1.00			
Satd. Flow (prot)	3095			3134		1540		1449			
Flt Permitted	1.00			0.90		1.00		1.00			
Satd. Flow (perm)	3095			2817		1540		1449			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92
Adj. Flow (vph)	536	220	29	589	165	778	34	723	21	7	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	756	0	0	783	0	812	0	751	0	0	0
Confl. Peds. (#/hr)		34			11						
Heavy Vehicles (%)	0%	0%	0%	1%	2%	1%	3%	4%	0%	14%	2%
Parking (#/hr)						0		6			
Turn Type	NA		Perm	NA		NA		NA			
Protected Phases	4			8		2		6			10
Permitted Phases			8								
Actuated Green, G (s)	56.0			56.0		64.0		64.0			
Effective Green, g (s)	56.0			56.0		64.0		64.0			
Actuated g/C Ratio	0.43			0.43		0.49		0.49			
Clearance Time (s)	5.0			5.0		5.0		5.0			
Vehicle Extension (s)	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	1333			1213		758		713			
v/s Ratio Prot	0.24					c0.53		0.52			
v/s Ratio Perm				c0.28							
v/c Ratio	0.57			0.65		1.07		1.05			
Uniform Delay, d1	27.9			29.2		33.0		33.0			
Progression Factor	1.00			1.00		1.04		0.52			
Incremental Delay, d2	1.8			2.7		40.0		37.9			
Delay (s)	29.6			31.8		74.4		55.1			
Level of Service	C			C		E		E			
Approach Delay (s)	29.6			31.8		74.4		55.1			0.0
Approach LOS	C			C		E		E			A

Intersection Summary			
HCM 2000 Control Delay	48.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↱			↑	↱		↑	↱
Volume (vph)	104	216	9	220	360	22	0	786	133	0	728	86
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00			1.00	0.96		1.00	0.97
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Frt		1.00	0.85		0.99			1.00	0.85		1.00	0.85
Flt Protected		0.98	1.00		0.98			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1651	1384		3092			1550	1259		1491	1413
Flt Permitted		0.52	1.00		0.63			1.00	1.00		1.00	1.00
Satd. Flow (perm)		871	1384		1970			1550	1259		1491	1413
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	109	227	9	232	379	23	0	827	140	0	766	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	336	9	0	634	0	0	827	140	0	766	91
Confl. Peds. (#/hr)	4		4	4		4			6			6
Heavy Vehicles (%)	0%	0%	0%	1%	0%	5%	0%	1%	0%	10%	5%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		51.0	51.0		51.0			71.0	71.0		71.0	71.0
Effective Green, g (s)		51.0	51.0		51.0			71.0	71.0		71.0	71.0
Actuated g/C Ratio		0.39	0.39		0.39			0.55	0.55		0.55	0.55
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		341	542		772			846	687		814	771
v/s Ratio Prot								c0.53			0.51	
v/s Ratio Perm		c0.39	0.01		0.32				0.11			0.06
v/c Ratio		0.99	0.02		0.89dl			0.98	0.20		0.94	0.12
Uniform Delay, d1		39.1	24.2		35.4			28.7	15.1		27.5	14.3
Progression Factor		1.00	1.00		1.00			1.06	1.08		0.59	0.77
Incremental Delay, d2		45.2	0.1		9.6			23.9	0.6		9.4	0.1
Delay (s)		84.3	24.2		45.0			54.4	16.9		25.6	11.1
Level of Service		F	C		D			D	B		C	B
Approach Delay (s)		82.8			45.0			48.9			24.1	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	44.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1026: Ashland Ave. □ N Elston Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑	↱		↑	↱		↱			↱	
Volume (vph)	20	319	70	0	518	218	0	545	1	0	695	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	3.0		4.0			3.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.97		1.00			1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1596	1647	1336		2020	1480		1550			1515	
Flt Permitted	0.10	1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)	166	1647	1336		2020	1480		1550			1515	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	21	336	74	0	545	229	0	574	1	0	732	19
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	336	74	0	545	229	0	575	0	0	751	0
Confl. Peds. (#/hr)	8		9	9		8			3			1
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	1%	0%	5%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm		NA	custom		NA			NA	
Protected Phases		4			8	1		2			6	
Permitted Phases	4		4			8						
Actuated Green, G (s)	43.0	43.0	43.0		43.0	50.0		69.0			80.0	
Effective Green, g (s)	43.0	43.0	43.0		43.0	50.0		69.0			80.0	
Actuated g/C Ratio	0.33	0.33	0.33		0.33	0.38		0.53			0.62	
Clearance Time (s)	4.0	4.0	4.0		4.0	3.0		4.0			3.0	
Lane Grp Cap (vph)	54	544	441		668	569		822			932	
v/s Ratio Prot		0.20			c0.27	0.02		0.37			c0.50	
v/s Ratio Perm	0.13		0.06			0.13						
v/c Ratio	0.39	0.62	0.17		0.82	0.40		0.70			0.81	
Uniform Delay, d1	33.4	36.6	30.8		39.9	29.1		22.8			19.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00		0.54			0.60	
Incremental Delay, d2	19.8	5.2	0.8		10.6	2.1		2.3			3.1	
Delay (s)	53.2	41.8	31.6		50.5	31.2		14.6			14.5	
Level of Service	D	D	C		D	C		B			B	
Approach Delay (s)		40.6			44.8			14.6			14.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰		↰	↱			↑	↱
Volume (vph)	448	287	29	5	412	0	165	271	21	0	572	229
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	0.96
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99			1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1637	1608			1980		1637	1467			1689	1238
Flt Permitted	0.14	1.00			1.00		0.11	1.00			1.00	1.00
Satd. Flow (perm)	237	1608			1972		182	1467			1689	1238
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	472	302	31	5	434	0	174	285	22	0	602	241
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	472	333	0	0	439	0	174	307	0	0	602	241
Confl. Peds. (#/hr)	6		5	5		6	15		12			15
Heavy Vehicles (%)	1%	3%	0%	0%	3%	0%	1%	4%	5%	11%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)								0				0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA			NA	pm+ov
Protected Phases	7	4			8		5	2			6	7
Permitted Phases	4			8			2					6
Actuated Green, G (s)	61.4	61.4			30.4		59.6	59.6			49.0	77.0
Effective Green, g (s)	61.4	61.4			30.4		59.6	59.6			49.0	77.0
Actuated g/C Ratio	0.47	0.47			0.23		0.46	0.46			0.38	0.59
Clearance Time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	413	759			461		179	672			636	733
v/s Ratio Prot	c0.25	0.21					c0.06	0.21			c0.36	0.07
v/s Ratio Perm	c0.29				0.22		0.38					0.12
v/c Ratio	1.14	0.44			0.95		0.97	0.46			0.95	0.33
Uniform Delay, d1	38.5	22.8			49.1		28.8	24.1			39.2	13.4
Progression Factor	1.00	1.00			1.00		1.70	1.01			0.91	0.54
Incremental Delay, d2	89.4	0.4			29.9		32.0	0.8			19.1	0.2
Delay (s)	127.8	23.2			79.0		81.1	25.1			54.9	7.5
Level of Service	F	C			E		F	C			D	A
Approach Delay (s)		84.6			79.0			45.4			41.3	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	62.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	105.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1029: Ashland Ave. □ W Cortland St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↱			↱	
Volume (vph)	2	185	16	113	265	9	0	489	107	0	573	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00			1.00			1.00	
Frpb, ped/bikes		1.00	0.95		1.00			0.92			0.98	
Flpb, ped/bikes		1.00	1.00		0.99			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.98	
Flt Protected		1.00	1.00		0.99			1.00			1.00	
Satd. Flow (prot)		1713	1451		1692			888			1463	
Flt Permitted		1.00	1.00		0.72			1.00			1.00	
Satd. Flow (perm)		1709	1451		1230			888			1463	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	2	195	17	119	279	9	0	515	113	0	603	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	197	17	0	407	0	0	628	0	0	708	0
Confl. Peds. (#/hr)	62		8	8		62			125			24
Heavy Vehicles (%)	0%	5%	0%	5%	3%	0%	0%	2%	0%	50%	3%	5%
Parking (#/hr)								64			0	
Turn Type	Perm	NA	Perm	pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)		42.0	42.0		42.0			79.0			79.0	
Effective Green, g (s)		42.0	42.0		42.0			79.0			79.0	
Actuated g/C Ratio		0.32	0.32		0.32			0.61			0.61	
Clearance Time (s)		5.0	5.0		5.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		552	468		397			539			889	
v/s Ratio Prot								c0.71			0.48	
v/s Ratio Perm		0.12	0.01		c0.33							
v/c Ratio		0.36	0.04		1.03			1.17			0.80	
Uniform Delay, d1		33.7	30.1		44.0			25.5			19.4	
Progression Factor		1.00	1.00		1.00			1.18			0.51	
Incremental Delay, d2		1.8	0.1		51.8			90.7			5.1	
Delay (s)		35.5	30.3		95.8			120.9			15.1	
Level of Service		D	C		F			F			B	
Approach Delay (s)		35.1			95.8			120.9			15.1	
Approach LOS		D			F			F			B	

Intersection Summary			
HCM 2000 Control Delay	68.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1030: Ashland Ave. □ W Wabansia Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	4	74	9	4	26	0	551	3	0	675	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			0.97			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.91			0.91			1.00			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1414			1456			1300			1473	
Flt Permitted		0.90			0.95			1.00			1.00	
Satd. Flow (perm)		1297			1396			1300			1473	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	34	4	78	9	4	27	0	580	3	0	711	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	40	0	0	583	0	0	719	0
Confl. Peds. (#/hr)	6		15	15		6						8
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	8%	3%	0%	0%	6%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			104.0			104.0	
Effective Green, g (s)		18.0			18.0			104.0			104.0	
Actuated g/C Ratio		0.14			0.14			0.80			0.80	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		179			193			1040			1178	
v/s Ratio Prot								0.45			c0.49	
v/s Ratio Perm		c0.09			0.03							
v/c Ratio		0.65			0.21			0.56			0.61	
Uniform Delay, d1		53.0			49.7			4.7			5.1	
Progression Factor		1.00			1.00			0.52			0.57	
Incremental Delay, d2		10.6			1.1			1.3			1.3	
Delay (s)		63.6			50.8			3.8			4.2	
Level of Service		E			D			A			A	
Approach Delay (s)		63.6			50.8			3.8			4.2	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1033: Ashland Ave. □ W North Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	101	584	57	140	558	34	0	594	143	0	718	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.94		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1480	2714		1520	2985			1250	985		1177	886
Flt Permitted	0.17	1.00		0.14	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	270	2714		217	2985			1250	985		1177	886
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	106	615	60	147	587	36	0	625	151	0	756	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	106	675	0	147	623	0	0	625	151	0	756	31
Confl. Peds. (#/hr)			48	48					21			20
Heavy Vehicles (%)	4%	11%	4%	1%	2%	6%	2%	3%	3%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	38.0	31.0		38.0	31.0			81.0	81.0		81.0	81.0
Effective Green, g (s)	38.0	31.0		38.0	31.0			81.0	81.0		81.0	81.0
Actuated g/C Ratio	0.29	0.24		0.29	0.24			0.62	0.62		0.62	0.62
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	647		133	711			778	613		733	552
v/s Ratio Prot	0.04	0.25		c0.06	0.21			0.50			c0.64	
v/s Ratio Perm	0.18			c0.26					0.15			0.03
v/c Ratio	0.74	1.04		1.11	0.88			0.80	0.25		1.03	0.06
Uniform Delay, d1	36.8	49.5		41.7	47.7			18.5	10.9		24.5	9.6
Progression Factor	1.00	1.00		1.00	1.00			0.88	0.87		0.46	0.53
Incremental Delay, d2	17.7	47.2		109.1	14.3			7.4	0.8		38.8	0.2
Delay (s)	54.4	96.7		150.8	61.9			23.8	10.4		50.1	5.3
Level of Service	D	F		F	E			C	B		D	A
Approach Delay (s)		90.9			78.9			21.1			48.4	
Approach LOS		F			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	59.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

1039: Ashland Ave. □ W Blackhawk St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	57	40	5	39	24	66	0	593	26	0	788	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	11	11	11	11	11	11
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.96			1.00			1.00	
Flpb, ped/bikes		0.98			0.97			1.00			1.00	
Frt		0.99			0.93			0.99			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1860			1456			1146			1438	
Flt Permitted		0.72			0.90			1.00			1.00	
Satd. Flow (perm)		1381			1324			1146			1438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	42	5	41	25	69	0	624	27	0	829	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	107	0	0	135	0	0	651	0	0	846	0
Confl. Peds. (#/hr)	18		38	38		18			5			47
Heavy Vehicles (%)	4%	0%	20%	5%	0%	2%	4%	1%	0%	1%	1%	0%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			100.0			100.0	
Effective Green, g (s)		24.0			24.0			100.0			100.0	
Actuated g/C Ratio		0.18			0.18			0.77			0.77	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		254			244			881			1106	
v/s Ratio Prot								0.57			c0.59	
v/s Ratio Perm		0.08			c0.10							
v/c Ratio		0.42			0.55			0.74			0.76	
Uniform Delay, d1		46.9			48.1			8.0			8.4	
Progression Factor		1.00			1.00			0.80			0.34	
Incremental Delay, d2		5.1			8.8			5.4			1.9	
Delay (s)		51.9			56.9			11.8			4.8	
Level of Service		D			E			B			A	
Approach Delay (s)		51.9			56.9			11.8			4.8	
Approach LOS		D			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1042: Ashland Ave. □ N Milwaukee Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↑	↱		↱			↱	
Volume (vph)	33	236	73	0	340	77	0	363	2	0	804	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	11	11	8	11	11	11
Total Lost time (s)	5.0	5.0			5.0	3.0		5.0			5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.90		1.00			1.00	
Flpb, ped/bikes	0.95	1.00			1.00	1.00		1.00			1.00	
Frt	1.00	0.96			1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1435	1592			1706	1312		1705			1535	
Flt Permitted	0.32	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)	488	1592			1706	1312		1705			1535	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.95	0.95	0.90	0.95	0.95	0.90	0.95	0.95
Adj. Flow (vph)	35	248	77	0	358	81	0	382	2	0	846	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	325	0	0	358	81	0	384	0	0	848	0
Confl. Peds. (#/hr)	49		18			49						5
Heavy Vehicles (%)	6%	5%	3%	0%	2%	1%	8%	2%	0%	5%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4					3 8						
Actuated Green, G (s)	32.0	32.0			37.0	37.0		83.0			83.0	
Effective Green, g (s)	32.0	32.0			37.0	37.0		83.0			83.0	
Actuated g/C Ratio	0.25	0.25			0.28	0.28		0.64			0.64	
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)	120	391			485	373		1088			980	
v/s Ratio Prot		c0.20			c0.21			0.23			c0.55	
v/s Ratio Perm	0.07					0.06						
v/c Ratio	0.29	0.83			0.74	0.22		0.35			0.87	
Uniform Delay, d1	39.8	46.4			42.1	35.5		11.0			19.0	
Progression Factor	1.00	1.00			1.00	1.00		0.38			0.73	
Incremental Delay, d2	6.1	18.3			9.7	1.3		0.7			8.7	
Delay (s)	45.9	64.7			51.8	36.8		4.9			22.5	
Level of Service	D	E			D	D		A			C	
Approach Delay (s)		62.9			49.0			4.9			22.5	
Approach LOS		E			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1043: Ashland Ave. □ W Division St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	104	461	29	251	716	15	0	408	144	0	680	183
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.66	1.00	1.00	0.56		1.00	0.68		1.00	0.67
Flpb, ped/bikes	0.86	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1421	3179	978	1577	3160	806		1464	1007		1550	866
Flt Permitted	0.34	1.00	1.00	0.33	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	508	3179	978	544	3160	806		1464	1007		1550	866
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.93	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	109	485	31	264	754	16	0	429	152	0	716	193
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	109	485	31	264	754	16	0	429	152	0	716	193
Confl. Peds. (#/hr)	169		130	130		169			244			272
Confl. Bikes (#/hr)						3						5
Heavy Vehicles (%)	0%	4%	0%	1%	1%	0%	7%	1%	0%	0%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.0	39.0	39.0	53.0	53.0	53.0		67.0	67.0		67.0	67.0
Effective Green, g (s)	39.0	39.0	39.0	53.0	53.0	53.0		67.0	67.0		67.0	67.0
Actuated g/C Ratio	0.30	0.30	0.30	0.41	0.41	0.41		0.52	0.52		0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	152	953	293	309	1288	328		754	518		798	446
v/s Ratio Prot		0.15		c0.07	0.24			0.29			c0.46	
v/s Ratio Perm	0.21		0.03	c0.28		0.02			0.15			0.22
v/c Ratio	0.72	0.51	0.11	0.85	0.59	0.05		0.57	0.29		0.90	0.43
Uniform Delay, d1	40.6	37.6	32.9	32.3	30.0	23.3		21.6	18.0		28.4	19.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.93	1.00		0.49	0.44
Incremental Delay, d2	25.1	1.9	0.7	24.8	2.0	0.3		2.6	1.2		8.0	1.5
Delay (s)	65.7	39.5	33.6	57.1	31.9	23.5		22.8	19.1		21.8	10.0
Level of Service	E	D	C	E	C	C		C	B		C	B
Approach Delay (s)		43.8			38.2			21.9			19.3	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1049: Ashland Ave. □ W Augusta Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	120	325	58	94	523	62	0	463	130	0	743	181
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94		1.00	0.81		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1565	1723	1426	1499	1663	1288		1365	1189		1255	1395
Flt Permitted	0.17	1.00	1.00	0.39	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	283	1723	1426	610	1663	1288		1365	1189		1255	1395
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	126	342	61	99	551	65	0	487	137	0	782	191
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	126	342	61	99	551	65	0	487	137	0	782	191
Confl. Peds. (#/hr)	14		5	5		14			37			6
Heavy Vehicles (%)	2%	1%	0%	2%	1%	0%	0%	2%	1%	2%	4%	1%
Parking (#/hr)								20			30	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0		73.0	73.0		73.0	73.0
Effective Green, g (s)	51.0	51.0	51.0	51.0	51.0	51.0		73.0	73.0		73.0	73.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.56	0.56		0.56	0.56
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	111	675	559	239	652	505		766	667		704	783
v/s Ratio Prot		0.20			0.33			0.36			c0.62	
v/s Ratio Perm	c0.44		0.04	0.16		0.05			0.12			0.14
v/c Ratio	1.14	0.51	0.11	0.41	0.85	0.13		0.64	0.21		1.11	0.24
Uniform Delay, d1	39.5	30.0	25.1	28.7	35.9	25.3		19.4	14.1		28.5	14.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.73	0.90
Incremental Delay, d2	126.4	0.6	0.1	1.2	9.8	0.1		4.0	0.7		62.2	0.4
Delay (s)	165.9	30.6	25.2	29.8	45.7	25.4		23.4	14.8		82.9	13.5
Level of Service	F	C	C	C	D	C		C	B		F	B
Approach Delay (s)		62.2			41.7			21.5			69.3	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	103	548	72	38	691	33	0	508	111	0	496	217
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.86		1.00	0.95
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1643	3215		1614	3246			1430	1279		1550	1404
Flt Permitted	0.20	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	353	3215		455	3246			1430	1279		1550	1404
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	108	577	76	40	727	35	0	535	117	0	522	228
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	108	653	0	40	762	0	0	535	117	0	522	228
Confl. Peds. (#/hr)	16		50	50		16			121			38
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	1%	1%	0%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	30.1	30.1		30.1	30.1			51.9	51.9		51.9	51.9
Effective Green, g (s)	30.1	30.1		30.1	30.1			51.9	51.9		51.9	51.9
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.58	0.58		0.58	0.58
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	118	1075		152	1085			824	737		893	809
v/s Ratio Prot		0.20			0.23			c0.37			0.34	
v/s Ratio Perm	c0.31			0.09					0.09			0.16
v/c Ratio	0.92	0.61		0.26	0.70			0.65	0.16		0.58	0.28
Uniform Delay, d1	28.7	25.0		21.9	26.1			12.9	8.9		12.2	9.6
Progression Factor	1.00	1.00		1.00	1.00			0.65	0.68		1.00	1.00
Incremental Delay, d2	56.7	1.0		0.9	2.1			3.2	0.4		2.8	0.9
Delay (s)	85.4	26.0		22.8	28.1			11.5	6.4		15.0	10.5
Level of Service	F	C		C	C			B	A		B	B
Approach Delay (s)		34.4			27.9			10.6			13.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1062: Ashland Ave. □ W Erie St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	53	28	25	15	55	23	0	652	7	0	649	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.97			0.97			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1524			1570			1462			1407	
Flt Permitted		0.83			0.95			1.00			1.00	
Satd. Flow (perm)		1302			1497			1462			1407	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	56	29	26	16	58	24	0	686	7	0	683	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	98	0	0	693	0	0	704	0
Confl. Peds. (#/hr)	8		16	16		8			11			8
Heavy Vehicles (%)	0%	7%	0%	7%	0%	0%	0%	1%	0%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			64.0			64.0	
Effective Green, g (s)		18.0			18.0			64.0			64.0	
Actuated g/C Ratio		0.20			0.20			0.71			0.71	
Clearance Time (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		260			299			1039			1000	
v/s Ratio Prot								0.47			c0.50	
v/s Ratio Perm		c0.09			0.07							
v/c Ratio		0.43			0.33			0.67			0.70	
Uniform Delay, d1		31.5			30.8			7.1			7.5	
Progression Factor		1.00			1.00			0.60			1.18	
Incremental Delay, d2		5.1			2.9			2.3			3.9	
Delay (s)		36.5			33.7			6.6			12.8	
Level of Service		D			C			A			B	
Approach Delay (s)		36.5			33.7			6.6			12.8	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

1066: Ashland Ave. □ W Grand Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↑	↱		↑	↱
Volume (vph)	156	584	92	82	676	104	0	531	50	0	498	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.95		1.00	0.89
Flpb, ped/bikes	1.00	1.00		0.96	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1564	2998		1526	3042			1430	1401		1535	1169
Flt Permitted	0.18	1.00		0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	289	2998		401	3042			1430	1401		1535	1169
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	164	615	97	86	712	109	0	559	53	0	524	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	164	712	0	86	821	0	0	559	53	0	524	75
Confl. Peds. (#/hr)	5		69	69		5			23			56
Heavy Vehicles (%)	2%	2%	1%	0%	3%	0%	10%	1%	0%	3%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	39.0	38.0		28.0	28.0			44.0	44.0		44.0	44.0
Effective Green, g (s)	39.0	38.0		28.0	28.0			44.0	44.0		44.0	44.0
Actuated g/C Ratio	0.43	0.42		0.31	0.31			0.49	0.49		0.49	0.49
Clearance Time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	224	1265		124	946			699	684		750	571
v/s Ratio Prot	c0.06	0.24			c0.27			c0.39			0.34	
v/s Ratio Perm	0.26			0.21					0.04			0.06
v/c Ratio	0.73	0.56		0.69	0.87			0.80	0.08		0.70	0.13
Uniform Delay, d1	31.3	19.7		27.2	29.3			19.3	12.2		17.9	12.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.99	1.10
Incremental Delay, d2	11.7	1.8		27.4	10.6			9.3	0.2		4.0	0.4
Delay (s)	42.9	21.5		54.6	39.9			28.6	12.4		21.8	14.2
Level of Service	D	C		D	D			C	B		C	B
Approach Delay (s)		25.5			41.3			27.2			20.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. □ W Fulton St. (West)

8/8/2013

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↑	↱	
Volume (vph)	53	55	0	464	742	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.97			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.93			1.00	0.99	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1458			1535	1489	
Flt Permitted	0.98			1.00	1.00	
Satd. Flow (perm)	1458			1535	1489	
Peak-hour factor, PHF	0.95	0.95	0.97	0.95	0.95	0.95
Adj. Flow (vph)	56	58	0	488	781	89
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	114	0	0	488	870	0
Confl. Peds. (#/hr)	18	3				
Heavy Vehicles (%)	2%	9%	21%	2%	4%	1%
Parking (#/hr)				0	0	
Turn Type	NA			NA	NA	
Protected Phases	4			2 10	6	
Permitted Phases						
Actuated Green, G (s)	16.0			88.0	80.0	
Effective Green, g (s)	16.0			88.0	80.0	
Actuated g/C Ratio	0.15			0.80	0.73	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	212			1228	1082	
v/s Ratio Prot	c0.08			c0.32	c0.58	
v/s Ratio Perm						
v/c Ratio	0.54			0.40	0.80	
Uniform Delay, d1	43.6			3.2	9.9	
Progression Factor	1.00			0.44	1.00	
Incremental Delay, d2	9.4			0.8	6.4	
Delay (s)	53.0			2.2	16.2	
Level of Service	D			A	B	
Approach Delay (s)	53.0			2.2	16.2	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↑
Volume (vph)	36	61	464	79	0	758
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	11	11	11	11
Total Lost time (s)	3.0		3.0			3.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.87		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		0.98			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1226		1507			1439
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	1226		1507			1439
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.99	0.95
Adj. Flow (vph)	38	64	488	83	0	798
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	102	0	571	0	0	798
Confl. Peds. (#/hr)	3	18				
Heavy Vehicles (%)	6%	7%	2%	1%	0%	4%
Parking (#/hr)			0			8
Turn Type	NA		NA			NA
Protected Phases	8		2			6 14
Permitted Phases						
Actuated Green, G (s)	16.0		80.0			88.0
Effective Green, g (s)	16.0		80.0			88.0
Actuated g/C Ratio	0.15		0.73			0.80
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	178		1096			1151
v/s Ratio Prot	c0.08		0.38			c0.55
v/s Ratio Perm						
v/c Ratio	0.57		0.52			0.69
Uniform Delay, d1	43.8		6.6			4.9
Progression Factor	1.00		0.67			0.17
Incremental Delay, d2	12.7		1.2			2.1
Delay (s)	56.5		5.6			2.9
Level of Service	E		A			A
Approach Delay (s)	56.5		5.6			2.9
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1077: Ashland Ave. □ W Lake St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↑	↱
Volume (vph)	34	274	31	32	307	89	0	491	25	0	586	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.98			0.99			1.00	0.62
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.99			1.00	0.85
Flt Protected		0.99			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1721			1686			1221			1689	819
Flt Permitted		0.92			0.96			1.00			1.00	1.00
Satd. Flow (perm)		1584			1617			1221			1689	819
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.93	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	36	288	33	34	323	94	0	517	26	0	617	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	357	0	0	451	0	0	543	0	0	617	32
Confl. Peds. (#/hr)	27		52	52		27			45			88
Confl. Bikes (#/hr)			2						2			
Heavy Vehicles (%)	3%	1%	0%	0%	1%	2%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA			NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8								6
Actuated Green, G (s)		40.0			40.0			62.0			62.0	62.0
Effective Green, g (s)		40.0			40.0			62.0			62.0	62.0
Actuated g/C Ratio		0.36			0.36			0.56			0.56	0.56
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		576			588			688			951	461
v/s Ratio Prot								c0.44			0.37	
v/s Ratio Perm		0.23			c0.28							0.04
v/c Ratio		0.62			0.77			0.79			0.65	0.07
Uniform Delay, d1		28.8			30.9			18.9			16.5	10.9
Progression Factor		1.00			1.00			0.36			0.62	0.56
Incremental Delay, d2		5.0			9.3			8.7			2.5	0.2
Delay (s)		33.7			40.1			15.5			12.6	6.3
Level of Service		C			D			B			B	A
Approach Delay (s)		33.7			40.1			15.5			12.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1079: Ashland Ave. □ W Washington Blvd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑↑			↑↱	
Volume (vph)	0	0	0	20	251	21	0	583	0	0	662	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00		0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00			0.99	
Flpb, ped/bikes				0.99	1.00	1.00		1.00			1.00	
Frt				1.00	1.00	0.85		1.00			0.98	
Flt Protected				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)				1585	3160	1401		3079			2759	
Flt Permitted				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (perm)				1585	3160	1401		3079			2759	
Peak-hour factor, PHF	0.91	0.97	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	0	0	0	21	264	22	0	614	0	0	697	104
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	21	264	22	0	614	0	0	801	0
Confl. Peds. (#/hr)			5	5		5			27			44
Confl. Bikes (#/hr)			2						1			1
Heavy Vehicles (%)	9%	0%	0%	0%	1%	0%	3%	2%	0%	0%	3%	0%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				31.0	31.0	31.0		71.0			71.0	
Effective Green, g (s)				31.0	31.0	31.0		71.0			71.0	
Actuated g/C Ratio				0.28	0.28	0.28		0.65			0.65	
Clearance Time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)				446	890	394		1987			1780	
v/s Ratio Prot					c0.08			0.20			c0.29	
v/s Ratio Perm				0.01		0.02						
v/c Ratio				0.05	0.30	0.06		0.31			0.45	
Uniform Delay, d1				28.7	31.0	28.8		8.6			9.7	
Progression Factor				1.00	1.00	1.00		0.21			0.82	
Incremental Delay, d2				0.2	0.9	0.3		0.4			0.7	
Delay (s)				28.9	31.8	29.1		2.2			8.7	
Level of Service				C	C	C		A			A	
Approach Delay (s)		0.0			31.4			2.2			8.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↱			↑↑	
Volume (vph)	46	338	71	0	0	0	0	570	36	0	562	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						0.95			0.95	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.99			1.00	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		2953						2741			2614	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		2953						2741			2614	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.96	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	48	356	75	0	0	0	0	600	38	0	592	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	479	0	0	0	0	0	638	0	0	592	0
Confl. Peds. (#/hr)			2						19			30
Confl. Bikes (#/hr)									3			3
Heavy Vehicles (%)	0%	1%	2%	0%	0%	0%	0%	2%	0%	3%	3%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		43.0						59.0			59.0	
Effective Green, g (s)		43.0						59.0			59.0	
Actuated g/C Ratio		0.39						0.54			0.54	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1154						1470			1402	
v/s Ratio Prot								c0.23			0.23	
v/s Ratio Perm		0.16										
v/c Ratio		0.42						0.43			0.42	
Uniform Delay, d1		24.4						15.4			15.3	
Progression Factor		1.00						0.58			0.87	
Incremental Delay, d2		1.1						0.8			0.9	
Delay (s)		25.5						9.7			14.2	
Level of Service		C						A			B	
Approach Delay (s)		25.5			0.0			9.7			14.2	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	⤴	→	⤵	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	44	614	84	14	828	208	0	485	4	0	591	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.97	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.97			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1587	2957		1548	2963			3105			3005	
Flt Permitted	0.17	1.00		0.30	1.00			1.00			1.00	
Satd. Flow (perm)	278	2957		493	2963			3105			3005	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	46	646	88	15	872	219	0	511	4	0	622	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	46	734	0	15	1091	0	0	515	0	0	668	0
Confl. Peds. (#/hr)	31		74	74		31			23			27
Confl. Bikes (#/hr)						3			1			2
Heavy Vehicles (%)	0%	5%	0%	0%	4%	0%	17%	1%	0%	5%	3%	2%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8								
Actuated Green, G (s)	52.0	52.0		63.0	61.0			41.0			41.0	
Effective Green, g (s)	52.0	52.0		63.0	61.0			41.0			41.0	
Actuated g/C Ratio	0.47	0.47		0.57	0.55			0.37			0.37	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	131	1397		282	1643			1157			1120	
v/s Ratio Prot		0.25			c0.37			0.17			c0.22	
v/s Ratio Perm	0.17			0.03								
v/c Ratio	0.35	0.53		0.05	0.66			0.45			0.60	
Uniform Delay, d1	18.3	20.3		10.4	17.3			25.9			27.8	
Progression Factor	1.00	1.00		1.00	1.00			0.64			0.69	
Incremental Delay, d2	7.3	1.4		0.4	2.1			1.0			2.2	
Delay (s)	25.6	21.8		10.7	19.4			17.6			21.4	
Level of Service	C	C		B	B			B			C	
Approach Delay (s)		22.0			19.3			17.6			21.4	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1083: Ashland Ave. □ W Ogden Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	172	742	0	204	640	0	0	367	168	0	396	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1708	3353		1636	3241			3076			2936	
Flt Permitted	0.36	1.00		0.29	1.00			1.00			1.00	
Satd. Flow (perm)	638	3353		495	3241			3076			2936	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	181	781	0	215	674	0	0	386	177	0	417	80
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	181	781	0	215	674	0	0	563	0	0	497	0
Confl. Peds. (#/hr)	3		7	7		3			13			22
Confl. Bikes (#/hr)			1			3			3			5
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	0%	2%	0%	0%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	3	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	57.0	57.0		71.0	70.0			32.0			32.0	
Effective Green, g (s)	57.0	57.0		71.0	70.0			32.0			32.0	
Actuated g/C Ratio	0.52	0.52		0.65	0.64			0.29			0.29	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	330	1737		423	2062			894			854	
v/s Ratio Prot		0.23		c0.05	0.21			c0.18			0.17	
v/s Ratio Perm	c0.28			0.28								
v/c Ratio	0.55	0.45		0.51	0.33			0.63			0.58	
Uniform Delay, d1	17.8	16.6		18.0	9.2			33.9			33.3	
Progression Factor	1.00	1.00		1.00	1.00			0.60			0.34	
Incremental Delay, d2	6.4	0.8		4.3	0.4			3.2			2.4	
Delay (s)	24.3	17.5		22.3	9.6			23.4			13.8	
Level of Service	C	B		C	A			C			B	
Approach Delay (s)		18.8			12.7			23.4			13.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑↱			↑↱	
Volume (vph)	0	50	34	52	52	20	0	540	20	0	454	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.98			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.98			0.99			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1561			1572			2858			3019	
Flt Permitted		1.00			0.86			1.00			1.00	
Satd. Flow (perm)		1561			1378			2858			3019	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	53	36	55	55	21	0	568	21	0	478	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	89	0	0	131	0	0	589	0	0	479	0
Confl. Peds. (#/hr)	7		17	17		7			15			18
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	2%	5%	1%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		38.0			38.0			64.0			64.0	
Effective Green, g (s)		38.0			38.0			64.0			64.0	
Actuated g/C Ratio		0.35			0.35			0.58			0.58	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		539			476			1662			1756	
v/s Ratio Prot		0.06						c0.21			0.16	
v/s Ratio Perm					c0.10							
v/c Ratio		0.17			0.28			0.35			0.27	
Uniform Delay, d1		25.0			26.0			12.1			11.4	
Progression Factor		1.00			1.00			0.33			0.43	
Incremental Delay, d2		0.7			1.4			0.6			0.3	
Delay (s)		25.6			27.5			4.5			5.2	
Level of Service		C			C			A			A	
Approach Delay (s)		25.6			27.5			4.5			5.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1085: Ashland Ave. □ W Adams St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑↱			↑↱	
Volume (vph)	0	0	0	68	144	83	0	506	0	0	645	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.96			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					2939			2642			2908	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					2939			2642			2908	
Peak-hour factor, PHF	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	72	152	87	0	533	0	0	679	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	311	0	0	533	0	0	726	0
Confl. Peds. (#/hr)			8	8		32			17			33
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	6%	0%	0%	0%	1%	1%	0%	2%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								54			12	12
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					35.0			67.0			67.0	
Effective Green, g (s)					35.0			67.0			67.0	
Actuated g/C Ratio					0.32			0.61			0.61	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					935			1609			1771	
v/s Ratio Prot								0.20			c0.25	
v/s Ratio Perm					0.11							
v/c Ratio					0.33			0.33			0.41	
Uniform Delay, d1					28.6			10.5			11.2	
Progression Factor					1.00			0.28			0.63	
Incremental Delay, d2					1.0			0.5			0.7	
Delay (s)					29.6			3.5			7.7	
Level of Service					C			A			A	
Approach Delay (s)		0.0			29.6			3.5			7.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱			↑↑	
Volume (vph)	62	228	109	0	0	0	0	638	90	0	472	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0			4.0	
Lane Util. Factor		0.95	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.97					0.99			1.00	
Flpb, ped/bikes		1.00	1.00					1.00			1.00	
Frt		1.00	0.85					0.98			1.00	
Flt Protected		0.99	1.00					1.00			1.00	
Satd. Flow (prot)		3301	1472					3167			2889	
Flt Permitted		0.99	1.00					1.00			1.00	
Satd. Flow (perm)		3301	1472					3167			2889	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.88	0.95	0.92	0.95	0.95	0.88	0.95	0.95
Adj. Flow (vph)	65	240	115	0	0	0	0	672	95	0	497	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	305	115	0	0	0	0	767	0	0	497	0
Confl. Peds. (#/hr)	6		13			6			20			9
Heavy Vehicles (%)	0%	3%	1%	2%	0%	0%	2%	2%	1%	4%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4		4									
Actuated Green, G (s)		38.0	38.0					63.0			63.0	
Effective Green, g (s)		38.0	38.0					63.0			63.0	
Actuated g/C Ratio		0.35	0.35					0.57			0.57	
Clearance Time (s)		5.0	5.0					4.0			4.0	
Lane Grp Cap (vph)		1140	508					1813			1654	
v/s Ratio Prot								c0.24			0.17	
v/s Ratio Perm		0.09	0.08									
v/c Ratio		0.27	0.23					0.42			0.30	
Uniform Delay, d1		26.0	25.6					13.3			12.1	
Progression Factor		1.00	1.00					0.50			0.49	
Incremental Delay, d2		0.6	1.0					0.6			0.4	
Delay (s)		26.5	26.6					7.2			6.4	
Level of Service		C	C					A			A	
Approach Delay (s)		26.6			0.0			7.2			6.4	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1088: Ashland Ave. □ W Van Buren St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↑	↱	↰	↰↑			↑↱	
Volume (vph)	0	0	0	292	340	185	337	522	0	0	673	129
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				0.97	1.00	1.00	0.91	0.91			0.95	
Frpb, ped/bikes				1.00	1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	1.00	1.00	0.95	0.99			1.00	
Satd. Flow (prot)				3144	1673	1397	1475	2930			2955	
Flt Permitted				0.95	1.00	1.00	0.95	0.90			1.00	
Satd. Flow (perm)				3144	1673	1397	1475	2657			2955	
Peak-hour factor, PHF	0.91	0.99	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	0	0	0	307	358	195	355	549	0	0	708	136
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	307	358	195	291	613	0	0	844	0
Confl. Peds. (#/hr)						8	15		9			15
Confl. Bikes (#/hr)						3			1			9
Heavy Vehicles (%)	7%	0%	0%	2%	4%	3%	2%	2%	0%	0%	3%	1%
Parking (#/hr)								0			0	
Turn Type				Split	NA	Perm	Prot	NA			NA	
Protected Phases				8	8		5	5 6			6 16	
Permitted Phases						8						
Actuated Green, G (s)				25.0	25.0	25.0	38.0	50.0			35.0	
Effective Green, g (s)				25.0	25.0	25.0	38.0	50.0			33.0	
Actuated g/C Ratio				0.23	0.23	0.23	0.35	0.45			0.30	
Clearance Time (s)				4.0	4.0	4.0	4.0					
Lane Grp Cap (vph)				714	380	317	509	1302			886	
v/s Ratio Prot				0.10	c0.21		c0.20	0.16			c0.29	
v/s Ratio Perm						0.14		0.05				
v/c Ratio				0.43	0.94	0.62	0.57	0.47			0.95	
Uniform Delay, d1				36.4	41.8	38.2	29.4	20.8			37.7	
Progression Factor				1.00	1.00	1.00	0.54	0.40			0.78	
Incremental Delay, d2				1.9	33.6	8.6	1.9	0.5			20.6	
Delay (s)				38.3	75.4	46.8	17.7	8.9			49.8	
Level of Service				D	E	D	B	A			D	
Approach Delay (s)		0.0			55.7			11.7			49.8	
Approach LOS		A			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱		↰	↑↑	
Volume (vph)	192	268	258	0	0	0	0	732	322	256	609	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3290	1471					2911		1637	3031	
Flt Permitted		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		3290	1471					2911		1637	3031	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.96	0.95	0.96	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	202	282	272	0	0	0	0	771	339	269	641	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	484	272	0	0	0	0	1110	0	269	641	0
Confl. Peds. (#/hr)									3	3		2
Heavy Vehicles (%)	3%	1%	4%	1%	0%	0%	0%	2%	1%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2 12		1	1 2	
Permitted Phases			4									
Actuated Green, G (s)		26.0	26.0					43.0		29.0	60.0	
Effective Green, g (s)		26.0	26.0					41.0		29.0	60.0	
Actuated g/C Ratio		0.24	0.24					0.37		0.26	0.55	
Clearance Time (s)		4.0	4.0							4.0		
Lane Grp Cap (vph)		777	347					1085		431	1653	
v/s Ratio Prot		0.15						c0.38		c0.16	0.21	
v/s Ratio Perm			c0.18									
v/c Ratio		0.62	0.78					1.02		0.62	0.39	
Uniform Delay, d1		37.6	39.4					34.5		35.7	14.4	
Progression Factor		1.00	1.00					0.74		0.61	0.84	
Incremental Delay, d2		3.7	16.1					29.2		4.3	0.4	
Delay (s)		41.4	55.5					54.6		26.1	12.6	
Level of Service		D	E					D		C	B	
Approach Delay (s)		46.4			0.0			54.6			16.6	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	280	308	161	60	164	54	0	1018	84	0	689	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1488	2897		1521	2877			3041			2960	
Flt Permitted	0.50	0.92		0.44	1.00			1.00			1.00	
Satd. Flow (perm)	778	2663		705	2877			3041			2960	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	295	324	169	63	173	57	0	1072	88	0	725	107
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	248	540	0	63	230	0	0	1160	0	0	832	0
Confl. Peds. (#/hr)	29		84	84		29			36			18
Confl. Bikes (#/hr)			1			2			3			1
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	1%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA			NA			NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	43.0	43.0		21.0	21.0			57.0			57.0	
Effective Green, g (s)	43.0	43.0		21.0	21.0			57.0			57.0	
Actuated g/C Ratio	0.39	0.39		0.19	0.19			0.52			0.52	
Clearance Time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	426	1081		134	549			1575			1533	
v/s Ratio Prot	c0.10	0.09			0.08			c0.38			0.28	
v/s Ratio Perm	c0.13	0.11		0.09								
v/c Ratio	0.58	0.50		0.47	0.42			0.74			0.54	
Uniform Delay, d1	24.6	25.4		39.6	39.1			20.6			17.8	
Progression Factor	1.00	1.00		1.00	1.00			0.70			1.24	
Incremental Delay, d2	5.7	1.6		11.4	2.3			2.8			1.2	
Delay (s)	30.3	27.0		50.9	41.5			17.2			23.2	
Level of Service	C	C		D	D			B			C	
Approach Delay (s)		28.0			43.5			17.2			23.2	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1091: Ashland Ave. □ W Flourney St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✥			↑↱			↑↱	
Volume (vph)	360	0	91	0	0	4	0	825	4	0	723	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.98		0.98			1.00			1.00	
Flpb, ped/bikes	0.99		1.00		1.00			1.00			1.00	
Frt	1.00		0.85		0.86			1.00			1.00	
Flt Protected	0.95		1.00		1.00			1.00			1.00	
Satd. Flow (prot)	3077		1400		1533			3046			3064	
Flt Permitted	0.76		1.00		1.00			1.00			1.00	
Satd. Flow (perm)	2446		1400		1533			3046			3064	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.91	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	379	0	96	0	0	4	0	868	4	0	761	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	379	0	96	0	4	0	0	872	0	0	781	0
Confl. Peds. (#/hr)	3		6	6		3			18			11
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	37.0		37.0		37.0			64.0			64.0	
Effective Green, g (s)	37.0		37.0		37.0			64.0			64.0	
Actuated g/C Ratio	0.34		0.34		0.34			0.58			0.58	
Clearance Time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Grp Cap (vph)	822		470		515			1772			1782	
v/s Ratio Prot					0.00			c0.29			0.25	
v/s Ratio Perm	c0.15		0.07									
v/c Ratio	0.46		0.20		0.01			0.49			0.44	
Uniform Delay, d1	28.7		26.0		24.3			13.5			12.9	
Progression Factor	1.00		1.00		1.00			0.37			0.61	
Incremental Delay, d2	1.9		1.0		0.0			0.7			0.7	
Delay (s)	30.5		27.0		24.3			5.8			8.5	
Level of Service	C		C		C			A			A	
Approach Delay (s)		29.8			24.3			5.8			8.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1092: Ashland Ave. □ W Polk St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑↱			↑↱	
Volume (vph)	220	60	99	14	16	43	0	771	11	0	785	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.94			0.94			1.00			0.99	
Flpb, ped/bikes		0.95			0.98			1.00			1.00	
Frt		0.96			0.92			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1409			1394			3044			2998	
Flt Permitted		0.78			0.92			1.00			1.00	
Satd. Flow (perm)		1136			1291			3044			2998	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	63	104	15	17	45	0	812	12	0	826	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	399	0	0	77	0	0	824	0	0	853	0
Confl. Peds. (#/hr)	61		136	136		61			46			41
Confl. Bikes (#/hr)			10			6			8			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	1%	2%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		58.0			58.0			44.0			44.0	
Effective Green, g (s)		58.0			58.0			44.0			44.0	
Actuated g/C Ratio		0.53			0.53			0.40			0.40	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		598			680			1217			1199	
v/s Ratio Prot								0.27			c0.28	
v/s Ratio Perm		c0.35			0.06							
v/c Ratio		0.67			0.11			0.68			0.71	
Uniform Delay, d1		19.0			13.1			27.2			27.7	
Progression Factor		1.00			1.00			0.58			0.59	
Incremental Delay, d2		5.8			0.3			2.8			3.3	
Delay (s)		24.8			13.4			18.6			19.6	
Level of Service		C			B			B			B	
Approach Delay (s)		24.8			13.4			18.6			19.6	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1093: Ashland Ave. □ W Taylor St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	104	296	79	52	163	58	0	597	144	0	585	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.75		0.96			0.92	
Flpb, ped/bikes	0.83	1.00	1.00	0.96	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1318	1631	1280	1525	1615	1044		2834			2720	
Flt Permitted	0.60	1.00	1.00	0.44	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	835	1631	1280	702	1615	1044		2834			2720	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	109	312	83	55	172	61	0	628	152	0	616	165
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	109	312	83	55	172	61	0	780	0	0	781	0
Confl. Peds. (#/hr)	152		57	57		152			40			77
Confl. Bikes (#/hr)			8			3			3			2
Heavy Vehicles (%)	0%	3%	0%	0%	4%	3%	0%	3%	0%	6%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0		58.0			58.0	
Effective Green, g (s)	43.0	43.0	43.0	43.0	43.0	43.0		58.0			58.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.53			0.53	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Grp Cap (vph)	326	637	500	274	631	408		1494			1434	
v/s Ratio Prot		c0.19			0.11			0.28			c0.29	
v/s Ratio Perm	0.13		0.06	0.08		0.06						
v/c Ratio	0.33	0.49	0.17	0.20	0.27	0.15		0.52			0.54	
Uniform Delay, d1	23.5	25.2	21.8	22.1	22.8	21.7		17.0			17.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.32			0.51	
Incremental Delay, d2	2.7	2.7	0.7	1.6	1.1	0.8		1.0			1.1	
Delay (s)	26.2	27.9	22.5	23.8	23.9	22.4		23.4			9.8	
Level of Service	C	C	C	C	C	C		C			A	
Approach Delay (s)		26.7			23.6			23.4			9.8	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1094: Ashland Ave. □ W Roosevelt Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	136	1492	288	169	797	105	0	463	106	0	642	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.90		1.00	0.90		1.00	0.92
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1576	4354		1596	3099	1254		1550	1180		1673	1196
Flt Permitted	0.19	1.00		0.09	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	311	4354		159	3099	1254		1550	1180		1673	1196
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	143	1571	303	178	839	111	0	487	112	0	676	120
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	143	1874	0	178	839	111	0	487	112	0	676	120
Confl. Peds. (#/hr)	76		47	47		76			78			62
Confl. Bikes (#/hr)			4			3			1			6
Heavy Vehicles (%)	1%	1%	0%	0%	3%	2%	5%	1%	0%	3%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	56.0	46.0		49.3	42.3	42.3		44.0	44.0		44.0	44.0
Effective Green, g (s)	56.0	46.0		49.3	42.3	42.3		44.0	44.0		44.0	44.0
Actuated g/C Ratio	0.51	0.42		0.45	0.38	0.38		0.40	0.40		0.40	0.40
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	5.0	3.0		5.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	281	1820		162	1191	482		620	472		669	478
v/s Ratio Prot	c0.05	0.43		c0.07	0.27			0.31			c0.40	
v/s Ratio Perm	0.21			c0.42		0.09			0.09			0.10
v/c Ratio	0.51	1.03		1.10	0.70	0.23		0.79	0.24		1.01	0.25
Uniform Delay, d1	17.0	32.0		25.1	28.6	22.9		28.9	21.9		33.0	22.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.70	0.78		0.61	0.50
Incremental Delay, d2	3.0	29.1		99.6	3.5	1.1		6.2	0.7		35.8	1.1
Delay (s)	20.0	61.1		124.7	32.1	24.0		26.3	17.7		55.7	12.2
Level of Service	C	E		F	C	C		C	B		E	B
Approach Delay (s)		58.2			45.9			24.7			49.2	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	49.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1096: Ashland Ave. □ W 13th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	191	0	314	5	0	2	0	550	0	0	597	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.96			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1556			1654			1520			1517	
Flt Permitted		0.87			0.84			1.00			1.00	
Satd. Flow (perm)		1384			1443			1520			1517	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.91	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	201	0	331	5	0	2	0	579	0	0	628	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	532	0	0	7	0	0	579	0	0	637	0
Confl. Peds. (#/hr)	7		7	7		7			28			5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	3%	0%	6%	0%	4%	3%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		46.1			46.1			55.9			55.9	
Effective Green, g (s)		46.1			46.1			55.9			55.9	
Actuated g/C Ratio		0.42			0.42			0.51			0.51	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		580			604			772			770	
v/s Ratio Prot								0.38			c0.42	
v/s Ratio Perm		c0.38			0.00							
v/c Ratio		0.92			0.01			0.75			0.83	
Uniform Delay, d1		30.1			18.7			21.5			23.0	
Progression Factor		1.00			1.00			0.47			0.83	
Incremental Delay, d2		20.3			0.0			6.0			4.5	
Delay (s)		50.4			18.7			16.0			23.5	
Level of Service		D			B			B			C	
Approach Delay (s)		50.4			18.7			16.0			23.5	
Approach LOS		D			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	0	0	198	16	0	6	0	475	0	0	581	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.91			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.97			1.00			1.00	
Frt		0.86			0.96			1.00			0.99	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1399			1624			1372			1520	
Flt Permitted		1.00			0.80			1.00			1.00	
Satd. Flow (perm)		1399			1351			1372			1520	
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.91	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	0	0	208	17	0	6	0	500	0	0	612	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	208	0	0	23	0	0	500	0	0	643	0
Confl. Peds. (#/hr)			24	24					12			14
Confl. Bikes (#/hr)			6						5			5
Heavy Vehicles (%)	7%	0%	1%	0%	0%	0%	2%	4%	0%	4%	2%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		29.0			29.0			73.0			73.0	
Effective Green, g (s)		29.0			29.0			73.0			73.0	
Actuated g/C Ratio		0.26			0.26			0.66			0.66	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		368			356			910			1008	
v/s Ratio Prot		c0.15						0.36			c0.42	
v/s Ratio Perm					0.02							
v/c Ratio		0.57			0.06			0.55			0.64	
Uniform Delay, d1		35.0			30.3			9.8			10.8	
Progression Factor		1.00			1.00			0.83			0.66	
Incremental Delay, d2		6.2			0.3			1.9			2.0	
Delay (s)		41.2			30.7			10.1			9.0	
Level of Service		D			C			B			A	
Approach Delay (s)		41.2			30.7			10.1			9.0	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1103: Ashland Ave. □ W 18th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	102	428	160	138	390	78	0	681	125	0	522	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.83	1.00	1.00	0.59		1.00	0.76		1.00	0.67
Flpb, ped/bikes	0.86	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1380	1663	1185	1511	1647	811		1351	1097		1326	940
Flt Permitted	0.29	1.00	1.00	0.25	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	427	1663	1185	395	1647	811		1351	1097		1326	940
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	107	451	168	145	411	82	0	717	132	0	549	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	107	451	168	145	411	82	0	717	132	0	549	66
Confl. Peds. (#/hr)	156		59	59		156			58			79
Confl. Bikes (#/hr)			6			11						4
Heavy Vehicles (%)	0%	1%	0%	1%	2%	4%	1%	3%	2%	6%	5%	6%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.0	39.0	39.0	39.0	39.0	39.0		60.0	60.0		60.0	60.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0		60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.55	0.55		0.55	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	151	589	420	140	583	287		736	598		723	512
v/s Ratio Prot		0.27			0.25			c0.53			0.41	
v/s Ratio Perm	0.25		0.14	c0.37		0.10			0.12			0.07
v/c Ratio	0.71	0.77	0.40	1.04	0.70	0.29		0.97	0.22		0.76	0.13
Uniform Delay, d1	30.6	31.5	26.7	35.5	30.5	25.5		24.2	12.9		19.4	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.77	0.72		0.97	0.93
Incremental Delay, d2	24.4	9.2	2.8	85.9	7.0	2.5		19.8	0.5		6.6	0.5
Delay (s)	55.0	40.6	29.5	121.4	37.6	28.0		38.5	9.8		25.4	11.9
Level of Service	E	D	C	F	D	C		D	A		C	B
Approach Delay (s)		40.2			55.4			34.0			24.0	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1105: Ashland Ave. □ W 19th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	46	45	15	51	75	61	0	798	26	0	670	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.95			0.99			0.99	
Flpb, ped/bikes		0.97			0.97			1.00			1.00	
Frt		0.98			0.96			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1638			1568			1382			1269	
Flt Permitted		0.71			0.88			1.00			1.00	
Satd. Flow (perm)		1185			1403			1382			1269	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	48	47	16	54	79	64	0	840	27	0	705	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	197	0	0	867	0	0	721	0
Confl. Peds. (#/hr)	44		50	50		44			66			46
Confl. Bikes (#/hr)			2			4			6			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	3%	0%	0%	6%	7%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			82.0			82.0	
Effective Green, g (s)		20.0			20.0			82.0			82.0	
Actuated g/C Ratio		0.18			0.18			0.75			0.75	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		215			255			1030			945	
v/s Ratio Prot								c0.63			0.57	
v/s Ratio Perm		0.09			c0.14							
v/c Ratio		0.52			0.77			0.84			0.76	
Uniform Delay, d1		40.6			42.8			9.6			8.3	
Progression Factor		1.00			1.00			0.24			0.76	
Incremental Delay, d2		8.6			20.0			4.7			4.0	
Delay (s)		49.2			62.9			7.0			10.3	
Level of Service		D			E			A			B	
Approach Delay (s)		49.2			62.9			7.0			10.3	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1107: Ashland Ave. □ W 21st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	39	78	27	148	99	30	0	725	51	0	646	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.97			0.99			0.99			1.00	
Flt Protected		0.99			0.97			1.00			1.00	
Satd. Flow (prot)		1700			1670			1331			1371	
Flt Permitted		0.86			0.70			1.00			1.00	
Satd. Flow (perm)		1477			1197			1331			1371	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	82	28	156	104	32	0	763	54	0	680	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	151	0	0	292	0	0	817	0	0	702	0
Confl. Peds. (#/hr)	33		17	17		33			18			20
Confl. Bikes (#/hr)			1			1			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	0%	3%	2%	2%	6%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.6			28.6			73.4			73.4	
Effective Green, g (s)		28.6			28.6			73.4			73.4	
Actuated g/C Ratio		0.26			0.26			0.67			0.67	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		384			311			888			914	
v/s Ratio Prot								c0.61			0.51	
v/s Ratio Perm		0.10			c0.24							
v/c Ratio		0.39			0.94			0.92			0.77	
Uniform Delay, d1		33.5			39.8			15.8			12.5	
Progression Factor		1.00			1.00			0.41			1.03	
Incremental Delay, d2		1.4			35.9			2.0			4.0	
Delay (s)		34.9			75.7			8.4			16.8	
Level of Service		C			E			A			B	
Approach Delay (s)		34.9			75.7			8.4			16.8	
Approach LOS		C			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↰	↑↱			↰	↑↱		↑	↱	↑	↱	
Volume (vph)	81	301	87	84	172	451	45	620	97	555	104	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	11	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95			1.00	0.95		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.98		1.00	0.98	1.00	0.86	
Flpb, ped/bikes	0.89	1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.97			1.00	0.99		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00			0.95	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1413	3045			1451	3066		895	701	1442	1069	
Flt Permitted	0.46	1.00			0.26	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (perm)	682	3045			398	3066		895	701	1442	1069	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	317	92	88	181	475	47	653	102	584	109	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	85	409	0	0	269	522	0	653	102	584	142	0
Confl. Peds. (#/hr)	99						99		6		53	
Confl. Bikes (#/hr)			2				6		6		1	
Heavy Vehicles (%)	0%	5%	2%	10%	10%	4%	3%	3%	8%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	3	0
Parking (#/hr)								74	74	6	6	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		NA	Perm	NA	Perm	
Protected Phases		4		3	3	8		2		6		
Permitted Phases	4			8	8				2		6	
Actuated Green, G (s)	19.9	19.9			30.9	30.9		57.0	57.0	57.0	57.0	
Effective Green, g (s)	19.9	19.9			30.9	30.9		57.0	57.0	57.0	57.0	
Actuated g/C Ratio	0.18	0.18			0.28	0.28		0.52	0.52	0.52	0.52	
Clearance Time (s)	4.0	4.0			3.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	123	550			188	861		463	363	747	553	
v/s Ratio Prot		0.13			c0.10	0.17		c0.73		0.41		
v/s Ratio Perm	0.12				c0.30				0.15		0.13	
v/c Ratio	0.69	0.74			1.43	0.61		1.41	0.28	0.78	0.26	
Uniform Delay, d1	42.2	42.6			37.3	34.3		26.5	14.9	21.5	14.7	
Progression Factor	1.00	1.00			1.00	1.00		0.97	0.96	0.69	0.77	
Incremental Delay, d2	15.4	5.4			221.7	1.2		195.6	1.7	3.6	0.2	
Delay (s)	57.6	48.0			259.0	35.5		221.3	16.0	18.5	11.6	
Level of Service	E	D			F	D		F	B	B	B	
Approach Delay (s)		49.7				111.5		193.5		17.1		
Approach LOS		D				F		F		B		

Intersection Summary			
HCM 2000 Control Delay	96.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. □ Ashland Ave. □ W Cermak Rd.

8/8/2013

Movement	NEL2	NEL	NER	NER2
Lane Configurations				
Volume (vph)	4	97	159	47
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	11	11	12	12
Total Lost time (s)		4.0	4.0	
Lane Util. Factor		1.00	0.88	
Frpb, ped/bikes		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.85	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1637	2507	
Flt Permitted		0.99	1.00	
Satd. Flow (perm)		1701	2507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	102	167	49
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	0	106	216	0
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Heavy Vehicles (%)	0%	1%	9%	2%
Bus Blockages (#/hr)	0	0	0	0
Parking (#/hr)				
Turn Type	Perm	NA	Perm	
Protected Phases		9		
Permitted Phases	9		9	
Actuated Green, G (s)		10.1	10.1	
Effective Green, g (s)		10.1	10.1	
Actuated g/C Ratio		0.09	0.09	
Clearance Time (s)		4.0	4.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		156	230	
v/s Ratio Prot				
v/s Ratio Perm		0.06	c0.09	
v/c Ratio		0.68	0.94	
Uniform Delay, d1		48.4	49.6	
Progression Factor		1.00	1.00	
Incremental Delay, d2		11.2	42.2	
Delay (s)		59.6	91.8	
Level of Service		E	F	
Approach Delay (s)		81.2		
Approach LOS		F		

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	2	0	4	0	0	1	0	799	0	0	778	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.94			0.95			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.91			0.86			1.00			1.00	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1500			1473			1657			1722	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1525			1473			1657			1722	
Peak-hour factor, PHF	0.95	0.94	0.95	0.95	0.94	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	2	0	4	0	0	1	0	841	0	0	819	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	6	0	0	1	0	0	841	0	0	820	0
Confl. Peds. (#/hr)	1		2	2		1			1			12
Confl. Bikes (#/hr)									2			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	14%	5%	0%	25%	1%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		1.6			1.6			98.4			98.4	
Effective Green, g (s)		1.6			1.6			98.4			98.4	
Actuated g/C Ratio		0.01			0.01			0.89			0.89	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		22			21			1482			1540	
v/s Ratio Prot					0.00			c0.51			0.48	
v/s Ratio Perm		c0.00										
v/c Ratio		0.27			0.05			0.57			0.53	
Uniform Delay, d1		53.6			53.4			1.2			1.2	
Progression Factor		1.00			1.00			1.00			0.50	
Incremental Delay, d2		13.6			2.0			1.6			0.7	
Delay (s)		67.2			55.4			2.8			1.3	
Level of Service		E			E			A			A	
Approach Delay (s)		67.2			55.4			2.8			1.3	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1111: Ashland Ave. □ W 27th St.

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑	↱
Volume (vph)	0	0	0	785	778	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)				5.0	5.0	
Lane Util. Factor				1.00	1.00	
Frpb, ped/bikes				1.00	1.00	
Flpb, ped/bikes				1.00	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				1689	1689	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				1689	1689	
Peak-hour factor, PHF	0.95	0.95	0.96	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	826	819	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	826	819	0
Confl. Peds. (#/hr)		10				16
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	0%	0%	50%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	3
Turn Type		Perm		NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4				6
Actuated Green, G (s)				100.0	100.0	
Effective Green, g (s)				100.0	100.0	
Actuated g/C Ratio				1.00	1.00	
Clearance Time (s)				5.0	5.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				1689	1689	
v/s Ratio Prot				c0.49	0.48	
v/s Ratio Perm						
v/c Ratio				0.49	0.48	
Uniform Delay, d1				0.0	0.0	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.8	1.0	
Delay (s)				0.8	1.0	
Level of Service				A	A	
Approach Delay (s)	0.0			0.8	1.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	0.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1112: Ashland Ave. □ W Marketplace Access Rd.

8/8/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↱	
Volume (vph)	8	18	0	692	706	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1710	1255		1171	1187	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1710	1255		1171	1187	
Peak-hour factor, PHF	0.95	0.95	0.92	0.95	0.95	0.95
Adj. Flow (vph)	8	19	0	728	743	5
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	8	19	0	728	748	0
Confl. Peds. (#/hr)		2				3
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	17%	29%	4%	4%	0%
Parking (#/hr)				40	38	
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	4.9	4.9		86.1	86.1	
Effective Green, g (s)	4.9	4.9		86.1	86.1	
Actuated g/C Ratio	0.05	0.05		0.86	0.86	
Clearance Time (s)	4.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	83	61		1008	1022	
v/s Ratio Prot	0.00			0.62	c0.63	
v/s Ratio Perm		c0.02				
v/c Ratio	0.10	0.31		0.72	0.73	
Uniform Delay, d1	45.4	45.9		2.6	2.6	
Progression Factor	1.00	1.00		1.58	1.00	
Incremental Delay, d2	0.5	2.9		3.8	4.1	
Delay (s)	45.9	48.8		7.8	6.7	
Level of Service	D	D		A	A	
Approach Delay (s)	48.0			7.8	6.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		✣			↱		↰	↑	↱
Volume (vph)	292	0	158	15	0	15	0	313	15	15	638	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Lane Util. Factor	1.00		1.00		1.00			1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00		0.98			0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00		1.00		1.00			1.00		0.96	1.00	1.00
Frt	1.00		0.85		0.93			0.99		1.00	1.00	0.85
Flt Protected	0.95		1.00		0.98			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1605		1232		802			1584		797	1689	1371
Flt Permitted	0.95		1.00		0.98			1.00		0.52	1.00	1.00
Satd. Flow (perm)	1605		1232		802			1584		440	1689	1371
Peak-hour factor, PHF	0.95	0.96	0.95	0.95	0.96	0.95	0.96	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	307	0	166	16	0	16	0	329	16	16	672	168
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	307	0	166	0	32	0	0	345	0	16	672	168
Confl. Peds. (#/hr)	2					2			70	70		3
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	3%	0%	20%	100%	0%	100%	0%	4%	100%	100%	3%	5%
Turn Type	Split		Perm	Split	NA			NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases			4							6		6
Actuated Green, G (s)	24.0		24.0		4.8			46.8		51.2	51.2	51.2
Effective Green, g (s)	24.0		24.0		4.8			46.8		51.2	51.2	51.2
Actuated g/C Ratio	0.24		0.24		0.05			0.47		0.51	0.51	0.51
Clearance Time (s)	4.0		4.0		4.0			12.0		2.0	12.0	12.0
Vehicle Extension (s)	3.0		3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	385		295		38			741		233	864	701
v/s Ratio Prot	c0.19				c0.04			0.22		0.00	c0.40	
v/s Ratio Perm			0.13							0.03		0.12
v/c Ratio	0.80		0.56		0.84			0.47		0.07	0.78	0.24
Uniform Delay, d1	35.7		33.4		47.2			18.1		12.2	19.8	13.6
Progression Factor	1.00		1.00		1.00			0.82		0.74	0.89	0.86
Incremental Delay, d2	15.7		7.6		85.4			1.6		0.1	5.5	0.6
Delay (s)	51.4		41.0		132.6			16.5		9.1	23.2	12.3
Level of Service	D		D		F			B		A	C	B
Approach Delay (s)		47.7			132.6			16.5			20.8	
Approach LOS		D			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. □ S Archer Ave.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↱			↱	
Volume (vph)	100	1049	115	178	991	47	0	301	99	0	454	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1651	4525		1635	4404			1406			1567	
Flt Permitted	0.18	1.00		0.11	1.00			1.00			1.00	
Satd. Flow (perm)	319	4525		183	4404			1406			1567	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	105	1104	121	187	1043	49	0	317	104	0	478	104
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	105	1225	0	187	1092	0	0	421	0	0	582	0
Confl. Peds. (#/hr)	24		69	69		24			65			25
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	2%	4%	1%	3%	7%	100%	7%	3%	7%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	41.1	34.7		47.6	38.2			42.4			42.4	
Effective Green, g (s)	41.1	34.7		47.6	38.2			42.4			42.4	
Actuated g/C Ratio	0.41	0.35		0.48	0.38			0.42			0.42	
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	216	1570		230	1682			596			664	
v/s Ratio Prot	0.03	0.27		c0.08	0.25			0.30			c0.37	
v/s Ratio Perm	0.17			c0.31								
v/c Ratio	0.49	0.78		0.81	0.65			0.71			0.88	
Uniform Delay, d1	19.1	29.2		19.8	25.4			23.7			26.4	
Progression Factor	1.00	1.00		1.00	1.00			0.87			0.63	
Incremental Delay, d2	3.6	2.6		19.3	2.0			6.7			11.0	
Delay (s)	22.6	31.8		39.1	27.4			27.4			27.7	
Level of Service	C	C		D	C			C			C	
Approach Delay (s)		31.1			29.1			27.4			27.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱	↰	↑			↳	
Volume (vph)	0	0	0	116	63	8	166	343	27	0	476	81
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	2.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	
Frpb, ped/bikes					1.00	0.96	1.00	0.99			0.99	
Flpb, ped/bikes					0.98	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	0.99			0.98	
Flt Protected					0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1630	1472	1496	1608			1571	
Flt Permitted					0.97	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1630	1472	559	1608			1571	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	122	66	8	175	361	28	0	501	85
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	188	8	175	389	0	0	586	0
Confl. Peds. (#/hr)			10	10		6	22		14			22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	10%	7%	0%	3%	8%	5%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					16.3	16.3	77.7	75.7			63.7	
Effective Green, g (s)					16.3	16.3	77.7	75.7			63.7	
Actuated g/C Ratio					0.16	0.16	0.78	0.76			0.64	
Clearance Time (s)					4.0	4.0	2.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					265	239	528	1217			1000	
v/s Ratio Prot							c0.03	0.24			c0.37	
v/s Ratio Perm					0.12	0.01	0.22					
v/c Ratio					0.71	0.03	0.33	0.32			0.59	
Uniform Delay, d1					39.6	35.2	8.6	3.9			10.5	
Progression Factor					1.00	1.00	0.56	0.45			0.56	
Incremental Delay, d2					8.4	0.1	0.3	0.6			1.3	
Delay (s)					48.0	35.3	5.1	2.4			7.1	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			47.5			3.2			7.1	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✣			↑			↑	
Volume (vph)	16	41	44	0	0	39	0	462	10	0	488	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99			0.97			1.00			1.00	
Flpb, ped/bikes	0.99	1.00			1.00			1.00			1.00	
Frt	1.00	0.92			0.86			1.00			1.00	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1694	1606			1396			1064			1431	
Flt Permitted	0.73	1.00			1.00			1.00			1.00	
Satd. Flow (perm)	1302	1606			1396			1064			1431	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.95	0.92	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	17	43	46	0	0	41	0	486	11	0	514	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	89	0	0	41	0	0	497	0	0	515	0
Confl. Peds. (#/hr)	4		2			4			5			7
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	0%	0%	4%	2%	2%	8%	2%	6%	0%	14%	7%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	20.0	20.0			20.0			72.0			72.0	
Effective Green, g (s)	20.0	20.0			20.0			72.0			72.0	
Actuated g/C Ratio	0.20	0.20			0.20			0.72			0.72	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	260	321			279			766			1030	
v/s Ratio Prot		c0.06			0.03			c0.47			0.36	
v/s Ratio Perm	0.01											
v/c Ratio	0.07	0.28			0.15			0.65			0.50	
Uniform Delay, d1	32.4	33.9			33.0			7.4			6.1	
Progression Factor	1.00	1.00			1.00			0.85			0.69	
Incremental Delay, d2	0.5	2.1			1.1			3.3			1.4	
Delay (s)	32.9	36.0			34.1			9.6			5.7	
Level of Service	C	D			C			A			A	
Approach Delay (s)		35.5			34.1			9.6			5.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱	↱		↑	↱		↑	↱
Volume (vph)	60	320	93	74	310	108	0	538	36	0	443	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.94		1.00	0.92
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1532	1570	1238	1515	1538	1220		1192	959		1193	984
Flt Permitted	0.33	1.00	1.00	0.35	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	526	1570	1238	560	1538	1220		1192	959		1193	984
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	63	337	98	78	326	114	0	566	38	0	466	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	63	337	98	78	337	103	0	566	38	0	466	38
Confl. Peds. (#/hr)	11		12	12		11			12			17
Confl. Bikes (#/hr)						2			1			
Heavy Vehicles (%)	3%	7%	10%	4%	3%	6%	14%	8%	6%	17%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	30.0	30.0	30.0	30.0	30.0	30.0		61.0	61.0		61.0	61.0
Effective Green, g (s)	30.0	30.0	30.0	30.0	30.0	30.0		61.0	61.0		61.0	61.0
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30		0.61	0.61		0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	157	471	371	168	461	366		727	584		727	600
v/s Ratio Prot		0.21			c0.22			c0.47			0.39	
v/s Ratio Perm	0.12		0.08	0.14		0.08			0.04			0.04
v/c Ratio	0.40	0.72	0.26	0.46	0.73	0.28		0.78	0.07		0.64	0.06
Uniform Delay, d1	27.9	31.2	26.6	28.5	31.4	26.8		14.5	7.9		12.5	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.66	0.85		0.68	0.68
Incremental Delay, d2	7.5	9.0	1.7	9.0	9.8	1.9		7.3	0.2		3.9	0.2
Delay (s)	35.3	40.2	28.3	37.4	41.2	28.7		16.8	6.9		12.4	5.6
Level of Service	D	D	C	D	D	C		B	A		B	A
Approach Delay (s)		37.2			38.1			16.2			11.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1123: Ashland Ave. □ W 37th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	24	4	15	12	16	19	0	554	16	0	476	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.95			0.95			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1650			1583			1461			1488	
Flt Permitted		0.87			0.92			1.00			1.00	
Satd. Flow (perm)		1478			1469			1461			1488	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	4	16	13	17	20	0	583	17	0	501	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	50	0	0	600	0	0	510	0
Confl. Peds. (#/hr)	4					4						1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	11%	5%	7%	0%	19%	5%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		8.9			8.9			82.1			82.1	
Effective Green, g (s)		8.9			8.9			82.1			82.1	
Actuated g/C Ratio		0.09			0.09			0.82			0.82	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		131			130			1199			1221	
v/s Ratio Prot								c0.41			0.34	
v/s Ratio Perm		0.03			c0.03							
v/c Ratio		0.34			0.38			0.50			0.42	
Uniform Delay, d1		42.8			43.0			2.7			2.4	
Progression Factor		1.00			1.00			0.78			0.81	
Incremental Delay, d2		3.3			3.9			1.4			0.9	
Delay (s)		46.1			46.9			3.6			2.9	
Level of Service		D			D			A			A	
Approach Delay (s)		46.1			46.9			3.6			2.9	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c   Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1127: Ashland Ave. □ W Pershing Rd.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	15	217	146	166	500	123	0	432	45	0	494	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1653	3033	1394	1585	3119	1321		1398	1143		1374	1291
Flt Permitted	0.43	1.00	1.00	0.48	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	748	3033	1394	805	3119	1321		1398	1143		1374	1291
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	16	228	154	175	526	129	0	455	47	0	520	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	228	154	175	526	129	0	455	47	0	520	33
Confl. Peds. (#/hr)			3	3					4			4
Heavy Vehicles (%)	0%	9%	3%	4%	6%	12%	1%	12%	13%	16%	14%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	25.7	23.3	23.3	36.8	31.4	31.4		57.2	57.2		57.2	57.2
Effective Green, g (s)	25.7	23.3	23.3	36.8	31.4	31.4		57.2	57.2		57.2	57.2
Actuated g/C Ratio	0.26	0.23	0.23	0.37	0.31	0.31		0.57	0.57		0.57	0.57
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	213	706	324	378	979	414		799	653		785	738
v/s Ratio Prot	0.00	0.08		c0.05	c0.17			0.33			c0.38	
v/s Ratio Perm	0.02		0.11	0.12		0.10			0.04			0.03
v/c Ratio	0.08	0.32	0.48	0.46	0.54	0.31		0.57	0.07		0.66	0.04
Uniform Delay, d1	27.9	31.8	33.1	22.6	28.3	26.1		13.6	9.6		14.7	9.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.75	0.68
Incremental Delay, d2	0.2	1.2	4.9	0.9	2.1	2.0		2.9	0.2		2.0	0.0
Delay (s)	28.0	33.0	38.0	23.5	30.4	28.0		16.5	9.8		13.2	6.4
Level of Service	C	C	D	C	C	C		B	A		B	A
Approach Delay (s)		34.7			28.6			15.9			12.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1130: Ashland Ave. □ W 42nd St. (West)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	⑂			↑	↱	
Volume (vph)	32	20	0	368	617	42
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	11	11	11	11
Total Lost time (s)	5.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.95			1.00	0.99	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1556			1187	1652	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1556			1187	1652	
Peak-hour factor, PHF	0.95	0.95	0.96	0.95	0.95	0.95
Adj. Flow (vph)	34	21	0	387	649	44
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	55	0	0	387	693	0
Confl. Peds. (#/hr)	4	1				6
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	5%	0%	7%	4%	7%
Parking (#/hr)				34		
Turn Type	NA			NA	NA	
Protected Phases	4			2 9	6	
Permitted Phases						
Actuated Green, G (s)	11.0			69.0	62.0	
Effective Green, g (s)	11.0			69.0	62.0	
Actuated g/C Ratio	0.12			0.77	0.69	
Clearance Time (s)	5.0				3.0	
Vehicle Extension (s)	8.0				3.0	
Lane Grp Cap (vph)	190			910	1138	
v/s Ratio Prot	c0.04			c0.33	c0.42	
v/s Ratio Perm						
v/c Ratio	0.29			0.43	0.61	
Uniform Delay, d1	35.9			3.6	7.5	
Progression Factor	1.00			0.34	1.00	
Incremental Delay, d2	3.6			0.3	2.4	
Delay (s)	39.5			1.5	9.9	
Level of Service	D			A	A	
Approach Delay (s)	39.5			1.5	9.9	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1131: Ashland Ave. □ W 42nd Pl.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑			↱	
Volume (vph)	8	0	22	0	11	5	0	361	1	0	376	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.90			0.96			1.00			0.99	
Flt Protected		0.99			1.00			1.00			1.00	
Satd. Flow (prot)		1599			1507			1491			1476	
Flt Permitted		0.93			1.00			1.00			1.00	
Satd. Flow (perm)		1510			1507			1491			1476	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	8	0	23	0	12	5	0	380	1	0	396	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	31	0	0	17	0	0	381	0	0	414	0
Confl. Peds. (#/hr)												4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	2%	5%	0%	67%	5%	12%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6 13	
Permitted Phases	4			8								
Actuated Green, G (s)		11.0			11.0			62.0			69.0	
Effective Green, g (s)		11.0			11.0			62.0			69.0	
Actuated g/C Ratio		0.12			0.12			0.69			0.77	
Clearance Time (s)		5.0			5.0			3.0				
Vehicle Extension (s)		8.0			8.0			3.0				
Lane Grp Cap (vph)		184			184			1027			1131	
v/s Ratio Prot					0.01			c0.26			c0.28	
v/s Ratio Perm		c0.02										
v/c Ratio		0.17			0.09			0.37			0.37	
Uniform Delay, d1		35.4			35.1			5.9			3.4	
Progression Factor		1.00			1.00			0.58			0.09	
Incremental Delay, d2		1.9			0.9			1.0			0.2	
Delay (s)		37.3			36.0			4.4			0.5	
Level of Service		D			D			A			A	
Approach Delay (s)		37.3			36.0			4.4			0.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1132: Ashland Ave. □ W 43rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	76	190	86	48	320	182	0	259	20	0	389	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97		1.00	0.97		1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1590	1515		1510	1600	1252		1259	1023		1221	979
Flt Permitted	0.41	1.00		0.47	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	690	1515		746	1600	1252		1259	1023		1221	979
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	80	200	91	51	337	192	0	273	21	0	409	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	80	291	0	51	337	192	0	273	21	0	409	67
Confl. Peds. (#/hr)	4		15	15		4			4			12
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	0%	5%	2%	4%	5%	11%	3%	5%	5%	22%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	32.0	32.0		32.0	32.0	32.0		49.0	49.0		49.0	49.0
Effective Green, g (s)	32.0	32.0		32.0	32.0	32.0		49.0	49.0		49.0	49.0
Actuated g/C Ratio	0.36	0.36		0.36	0.36	0.36		0.54	0.54		0.54	0.54
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	245	538		265	568	445		685	556		664	533
v/s Ratio Prot		0.19			c0.21			0.22			c0.33	
v/s Ratio Perm	0.12			0.07		0.15			0.02			0.07
v/c Ratio	0.33	0.54		0.19	0.59	0.43		0.40	0.04		0.62	0.13
Uniform Delay, d1	21.1	23.1		20.1	23.7	22.1		11.9	9.5		14.1	10.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.85	0.98		0.63	0.44
Incremental Delay, d2	3.5	3.9		1.6	4.5	3.0		1.7	0.1		4.1	0.5
Delay (s)	24.7	27.0		21.7	28.2	25.1		11.8	9.5		12.9	4.9
Level of Service	C	C		C	C	C		B	A		B	A
Approach Delay (s)		26.5			26.6			11.6			11.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1133: Ashland Ave. □ W 44th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	12	7	22	28	34	20	0	283	24	0	411	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.93			0.97			0.99			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1601			1621			1340			1133	
Flt Permitted		0.92			0.87			1.00			1.00	
Satd. Flow (perm)		1491			1435			1340			1133	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	7	23	29	36	21	0	298	25	0	433	39
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	43	0	0	86	0	0	323	0	0	472	0
Confl. Peds. (#/hr)	7		3	3		7			11			23
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	0%	7%	0%	6%	14%	5%	4%	10%	4%	5%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		9.8			9.8			71.2			71.2	
Effective Green, g (s)		9.8			9.8			71.2			71.2	
Actuated g/C Ratio		0.11			0.11			0.79			0.79	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		162			156			1060			896	
v/s Ratio Prot								0.24			c0.42	
v/s Ratio Perm		0.03			c0.06							
v/c Ratio		0.27			0.55			0.30			0.53	
Uniform Delay, d1		36.8			38.0			2.6			3.4	
Progression Factor		1.00			1.00			0.58			0.83	
Incremental Delay, d2		1.8			7.0			0.7			1.8	
Delay (s)		38.6			45.0			2.2			4.7	
Level of Service		D			D			A			A	
Approach Delay (s)		38.6			45.0			2.2			4.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1134: Ashland Ave. □ W 45th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	28	30	9	18	8	36	0	265	19	0	413	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.98			0.92			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1711			1586			1148			1167	
Flt Permitted		0.88			0.92			1.00			1.00	
Satd. Flow (perm)		1539			1483			1148			1167	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	29	32	9	19	8	38	0	279	20	0	435	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	65	0	0	299	0	0	471	0
Confl. Peds. (#/hr)	11		9	9		11			12			6
Confl. Bikes (#/hr)						1			2			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	5%	0%	0%	3%	3%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			58.0			58.0	
Effective Green, g (s)		23.0			23.0			58.0			58.0	
Actuated g/C Ratio		0.26			0.26			0.64			0.64	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		393			378			739			752	
v/s Ratio Prot								0.26			c0.40	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.18			0.17			0.40			0.63	
Uniform Delay, d1		26.1			26.1			7.7			9.5	
Progression Factor		1.00			1.00			0.76			0.48	
Incremental Delay, d2		1.0			1.0			1.6			3.5	
Delay (s)		27.1			27.1			7.4			8.0	
Level of Service		C			C			A			A	
Approach Delay (s)		27.1			27.1			7.4			8.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	36	78	49	12	33	51	0	234	45	0	379	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.95			0.97			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.96			0.93			0.98			0.98	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1648			1552			1129			1087	
Flt Permitted		0.92			0.96			1.00			1.00	
Satd. Flow (perm)		1533			1498			1129			1087	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	38	82	52	13	35	54	0	246	47	0	399	53
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	172	0	0	102	0	0	293	0	0	452	0
Confl. Peds. (#/hr)	37		9	9		37			39			14
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%	0%	5%	0%	2%	3%	4%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		21.0			21.0			61.0			61.0	
Effective Green, g (s)		21.0			21.0			61.0			61.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		357			349			765			736	
v/s Ratio Prot								0.26			c0.42	
v/s Ratio Perm		c0.11			0.07							
v/c Ratio		0.48			0.29			0.38			0.61	
Uniform Delay, d1		29.8			28.4			6.3			8.0	
Progression Factor		1.00			1.00			0.66			0.20	
Incremental Delay, d2		4.6			2.1			1.3			3.1	
Delay (s)		34.4			30.5			5.5			4.7	
Level of Service		C			C			A			A	
Approach Delay (s)		34.4			30.5			5.5			4.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1136: Ashland Ave. □ W 47th St. □ S. McDowell Ave.

8/8/2013

	↗	→	↘	↙	←	↖	↰	↑	↱	↗	↓	↙
Movement	**EBL2**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**WBR2**	**NBT**	**NBR**	**NBR2**	**SBT**	**SBR**
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	72	279	28	138	405	91	6	230	0	64	325	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.88		1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1478	2856		1540	2778			1041	1272		1506	1191
Flt Permitted	0.40	1.00		0.50	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	627	2856		802	2778			1041	1272		1506	1191
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	76	294	29	145	426	96	6	242	0	67	342	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	76	323	0	145	528	0	0	242	67	0	342	58
Confl. Peds. (#/hr)			53	53		74				75		25
Confl. Bikes (#/hr)						4				2		
Heavy Vehicles (%)	8%	9%	11%	1%	9%	6%	0%	7%	0%	2%	4%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								52			0	0
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	34.4	29.6		38.8	31.8			41.4	41.4		41.4	41.4
Effective Green, g (s)	34.4	29.6		38.8	31.8			41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.38	0.33		0.43	0.35			0.46	0.46		0.46	0.46
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	285	939		403	981			478	585		692	547
v/s Ratio Prot	0.01	0.11		c0.03	c0.19			c0.23			0.23	
v/s Ratio Perm	0.09			0.13					0.05			0.05
v/c Ratio	0.27	0.34		0.36	0.54			0.51	0.11		0.49	0.11
Uniform Delay, d1	18.2	22.9		16.2	23.2			17.1	13.9		17.0	13.8
Progression Factor	1.00	1.00		1.00	1.00			0.53	0.61		0.64	0.61
Incremental Delay, d2	0.5	1.0		0.6	2.1			3.5	0.4		2.0	0.3
Delay (s)	18.7	23.9		16.7	25.4			12.6	8.9		12.9	8.7
Level of Service	B	C		B	C			B	A		B	A
Approach Delay (s)		22.9			23.5			11.8			12.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

	↰
Movement	SWR2
Lane Configurations	↱
Volume (vph)	25
Ideal Flow (vphpl)	1800
Lane Width	12
Total Lost time (s)	5.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	1557
Flt Permitted	1.00
Satd. Flow (perm)	1557
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	26
RTOR Reduction (vph)	0
Lane Group Flow (vph)	26
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	31.8
Effective Green, g (s)	31.8
Actuated g/C Ratio	0.35
Clearance Time (s)	5.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	550
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.05
Uniform Delay, d1	19.1
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	19.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	22	44	18	0	322	0	0	617	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.97			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1642			1205			1073	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1642			1205			1073	
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.95	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	23	46	19	0	339	0	0	649	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	88	0	0	339	0	0	711	0
Confl. Peds. (#/hr)			20	20		21			10			27
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%	9%	4%	0%	0%	3%	5%
Parking (#/hr)								36			50	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			58.0			58.0	
Effective Green, g (s)					23.0			58.0			58.0	
Actuated g/C Ratio					0.26			0.64			0.64	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					419			776			691	
v/s Ratio Prot								0.28			c0.66	
v/s Ratio Perm					0.05							
v/c Ratio					0.21			0.44			1.03	
Uniform Delay, d1					26.4			7.9			16.0	
Progression Factor					1.00			1.08			0.76	
Incremental Delay, d2					1.1			1.7			41.2	
Delay (s)					27.5			10.2			53.4	
Level of Service					C			B			D	
Approach Delay (s)		0.0			27.5			10.2			53.4	
Approach LOS		A			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	44	74	24	12	29	24	0	232	34	0	411	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			0.99			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.98			0.95			0.98			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1706			1641			1108			1086	
Flt Permitted		0.89			0.94			1.00			1.00	
Satd. Flow (perm)		1549			1562			1108			1086	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	46	78	25	13	31	25	0	244	36	0	433	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	149	0	0	69	0	0	280	0	0	457	0
Confl. Peds. (#/hr)	17					17			18			26
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	4%	0%	0%	4%	0%	4%	3%	0%	3%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			57.0			57.0	
Effective Green, g (s)		24.0			24.0			57.0			57.0	
Actuated g/C Ratio		0.27			0.27			0.63			0.63	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		413			416			701			687	
v/s Ratio Prot								0.25			c0.42	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.36			0.17			0.40			0.67	
Uniform Delay, d1		26.8			25.3			8.1			10.5	
Progression Factor		1.00			1.00			0.76			0.10	
Incremental Delay, d2		2.4			0.9			1.6			0.5	
Delay (s)		29.2			26.2			7.8			1.5	
Level of Service		C			C			A			A	
Approach Delay (s)		29.2			26.2			7.8			1.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1139: Ashland Ave. □ W 50th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	20	18	16	14	10	37	0	240	20	0	401	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.97			0.99			0.99	
Flpb, ped/bikes		0.99			0.98			1.00			1.00	
Frt		0.96			0.92			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1633			1565			1112			1473	
Flt Permitted		0.91			0.94			1.00			1.00	
Satd. Flow (perm)		1505			1496			1112			1473	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	21	19	17	15	11	39	0	253	21	0	422	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	57	0	0	65	0	0	274	0	0	465	0
Confl. Peds. (#/hr)	13		40	40		13			25			42
Confl. Bikes (#/hr)			1						2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	4%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		25.0			25.0			56.0			56.0	
Effective Green, g (s)		25.0			25.0			56.0			56.0	
Actuated g/C Ratio		0.28			0.28			0.62			0.62	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		418			415			691			916	
v/s Ratio Prot								0.25			c0.32	
v/s Ratio Perm		0.04			c0.04							
v/c Ratio		0.14			0.16			0.40			0.51	
Uniform Delay, d1		24.4			24.5			8.5			9.4	
Progression Factor		1.00			1.00			1.73			0.36	
Incremental Delay, d2		0.7			0.8			1.6			1.6	
Delay (s)		25.1			25.3			16.3			4.9	
Level of Service		C			C			B			A	
Approach Delay (s)		25.1			25.3			16.3			4.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1140: Ashland Ave. □ W 51st St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	92	219	46	54	298	44	0	244	19	0	347	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.90		1.00	0.92		1.00	0.94
Flpb, ped/bikes	0.96	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1473	1631	1314	1476	1541	1259		1143	888		1088	879
Flt Permitted	0.43	1.00	1.00	0.54	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	670	1631	1314	842	1541	1259		1143	888		1088	879
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	231	48	57	314	46	0	257	20	0	365	57
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	97	231	48	57	314	46	0	257	20	0	365	57
Confl. Peds. (#/hr)	29		21	21		29			20			13
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	3%	0%	4%	9%	2%	3%	5%	5%	8%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0		50.0	50.0		50.0	50.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.56	0.56		0.56	0.56
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	230	561	452	290	530	433		635	493		604	488
v/s Ratio Prot		0.14			c0.20			0.22			c0.34	
v/s Ratio Perm	0.14		0.04	0.07		0.04			0.02			0.06
v/c Ratio	0.42	0.41	0.11	0.20	0.59	0.11		0.40	0.04		0.60	0.12
Uniform Delay, d1	22.6	22.5	20.1	20.7	24.3	20.1		11.5	9.1		13.4	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.33	0.41		0.35	0.44
Incremental Delay, d2	5.6	2.2	0.5	1.5	4.8	0.5		1.8	0.1		4.0	0.4
Delay (s)	28.2	24.8	20.5	22.3	29.1	20.6		5.6	3.9		8.6	4.6
Level of Service	C	C	C	C	C	C		A	A		A	A
Approach Delay (s)		25.1			27.2			5.5			8.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1142: Ashland Ave. □ W 53rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	16	10	13	0	282	3	0	421	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.95			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1607			1202			1106	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1607			1202			1106	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	17	11	14	0	297	3	0	443	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	42	0	0	300	0	0	463	0
Confl. Peds. (#/hr)			41	41		12			30			4
Confl. Bikes (#/hr)			4						3			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	20%	3%	5%
Parking (#/hr)								36			48	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			58.0			58.0	
Effective Green, g (s)					23.0			58.0			58.0	
Actuated g/C Ratio					0.26			0.64			0.64	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					410			774			712	
v/s Ratio Prot								0.25			c0.42	
v/s Ratio Perm					0.03							
v/c Ratio					0.10			0.39			0.65	
Uniform Delay, d1					25.6			7.6			9.8	
Progression Factor					1.00			0.58			1.03	
Incremental Delay, d2					0.5			1.4			4.0	
Delay (s)					26.1			5.8			14.1	
Level of Service					C			A			B	
Approach Delay (s)		0.0			26.1			5.8			14.1	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1144: Ashland Ave. □ W Garfield Blvd. (WB)

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑			↑	↱
Volume (vph)	0	0	0	156	864	63	0	253	0	0	340	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	11	11	11	11	11	11
Total Lost time (s)				5.0	5.0	5.0		3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes				1.00	1.00	0.92		1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00		1.00			1.00	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1494	3129	1288		1464			1188	1006
Flt Permitted				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1494	3129	1288		1464			1188	1006
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.95	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	164	909	66	0	266	0	0	358	93
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	164	909	66	0	266	0	0	358	93
Confl. Peds. (#/hr)						41			29			19
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	3%	2%	2%	4%	7%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm		NA			NA	Perm
Protected Phases					8			2 5			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				31.0	31.0	31.0		36.0			42.0	42.0
Effective Green, g (s)				31.0	31.0	31.0		36.0			42.0	42.0
Actuated g/C Ratio				0.34	0.34	0.34		0.40			0.47	0.47
Clearance Time (s)				5.0	5.0	5.0					3.0	3.0
Lane Grp Cap (vph)				514	1077	443		585			554	469
v/s Ratio Prot					c0.29			c0.18			c0.30	
v/s Ratio Perm				0.11		0.05						0.09
v/c Ratio				0.32	0.84	0.15		0.45			0.65	0.20
Uniform Delay, d1				21.7	27.3	20.4		19.8			18.3	14.1
Progression Factor				1.00	1.00	1.00		0.53			0.65	0.61
Incremental Delay, d2				1.6	8.1	0.7		2.2			4.8	0.8
Delay (s)				23.4	35.4	21.1		12.8			16.7	9.4
Level of Service				C	D	C		B			B	A
Approach Delay (s)		0.0			32.8			12.8			15.2	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱					↑	↱		↑	
Volume (vph)	69	709	115	0	0	0	0	256	124	0	468	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0		5.0	
Lane Util. Factor	1.00	0.95	1.00					1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.93					1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1494	3099	1283					1259	1102		1506	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1494	3099	1283					1259	1102		1506	
Peak-hour factor, PHF	0.95	0.95	0.95	0.94	0.94	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	73	746	121	0	0	0	0	269	131	0	493	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	73	746	121	0	0	0	0	269	131	0	493	0
Confl. Peds. (#/hr)			31						8			23
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	4%	0%	0%	0%	0%	5%	0%	4%	4%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			1 6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	31.0	31.0	31.0					32.0	32.0		49.0	
Effective Green, g (s)	31.0	31.0	31.0					32.0	32.0		49.0	
Actuated g/C Ratio	0.34	0.34	0.34					0.36	0.36		0.54	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0			
Lane Grp Cap (vph)	514	1067	441					447	391		819	
v/s Ratio Prot		c0.24						0.21			c0.33	
v/s Ratio Perm	0.05		0.09						0.12			
v/c Ratio	0.14	0.70	0.27					0.60	0.34		0.60	
Uniform Delay, d1	20.3	25.5	21.4					23.8	21.2		13.9	
Progression Factor	1.00	1.00	1.00					0.69	0.70		0.78	
Incremental Delay, d2	0.6	3.8	1.5					5.5	2.1		2.8	
Delay (s)	20.9	29.3	22.9					21.9	17.0		13.6	
Level of Service	C	C	C					C	B		B	
Approach Delay (s)		27.8			0.0			20.3			13.6	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1148: Ashland Ave. □ W 57th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	16	18	47	0	0	0	0	328	15	0	447	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.97						1.00			1.00	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.92						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1569						1172			1104	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1569						1172			1104	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	19	49	0	0	0	0	345	16	0	471	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	85	0	0	0	0	0	361	0	0	471	0
Confl. Peds. (#/hr)	42		16			42			22			29
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	4%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						58.0			58.0	
Effective Green, g (s)		23.0						58.0			58.0	
Actuated g/C Ratio		0.26						0.64			0.64	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		400						755			711	
v/s Ratio Prot								0.31			c0.43	
v/s Ratio Perm		0.05										
v/c Ratio		0.21						0.48			0.66	
Uniform Delay, d1		26.4						8.2			9.9	
Progression Factor		1.00						0.91			0.64	
Incremental Delay, d2		1.2						2.0			4.1	
Delay (s)		27.6						9.5			10.5	
Level of Service		C						A			B	
Approach Delay (s)		27.6			0.0			9.5			10.5	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

1150: Ashland Ave. □ W 59th St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	80	242	62	111	404	36	0	292	40	0	516	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.65	1.00	1.00	0.97		1.00	1.00		1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	0.91	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1594	1556	883	1457	1600	1340		1288	1125		1506	1220
Flt Permitted	0.33	1.00	1.00	0.48	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	553	1556	883	743	1600	1340		1288	1125		1506	1220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	84	255	65	117	425	38	0	307	42	0	543	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	255	65	117	425	38	0	307	42	0	543	37
Confl. Peds. (#/hr)	5		120	120		5						19
Heavy Vehicles (%)	0%	8%	5%	0%	5%	3%	2%	4%	0%	7%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	31.0	31.0	38.2	32.6	32.6		41.4	41.4		41.4	41.4
Effective Green, g (s)	35.0	31.0	31.0	38.2	32.6	32.6		41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.39	0.34	0.34	0.42	0.36	0.36		0.46	0.46		0.46	0.46
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	261	535	304	359	579	485		592	517		692	561
v/s Ratio Prot	0.01	0.16		c0.02	c0.27			0.24			c0.36	
v/s Ratio Perm	0.11		0.07	0.12		0.03			0.04			0.03
v/c Ratio	0.32	0.48	0.21	0.33	0.73	0.08		0.52	0.08		0.78	0.07
Uniform Delay, d1	18.5	23.1	20.9	16.5	24.9	18.8		17.2	13.6		20.5	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.96	0.86		0.86	1.16
Incremental Delay, d2	0.7	3.0	1.6	0.5	8.0	0.3		3.0	0.3		7.5	0.2
Delay (s)	19.2	26.2	22.5	17.0	33.0	19.2		19.6	12.0		25.2	15.9
Level of Service	B	C	C	B	C	B		B	B		C	B
Approach Delay (s)		24.1			28.8			18.7			24.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1152: Ashland Ave. □ W 61st St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	31	24	50	0	0	0	0	309	28	0	553	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.94						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1808						1235			1064	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1808						1235			1064	
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	33	25	53	0	0	0	0	325	29	0	582	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	0	0	0	354	0	0	582	0
Confl. Peds. (#/hr)	10		16			10			38			28
Confl. Bikes (#/hr)									1			3
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	2%	0%	14%	3%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						58.0			58.0	
Effective Green, g (s)		23.0						58.0			58.0	
Actuated g/C Ratio		0.26						0.64			0.64	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		462						795			685	
v/s Ratio Prot								0.29			c0.55	
v/s Ratio Perm		0.06										
v/c Ratio		0.24						0.45			0.85	
Uniform Delay, d1		26.6						8.0			12.6	
Progression Factor		1.00						1.00			0.54	
Incremental Delay, d2		1.2						1.8			9.8	
Delay (s)		27.8						9.8			16.7	
Level of Service		C						A			B	
Approach Delay (s)		27.8			0.0			9.8			16.7	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1154: Ashland Ave. □ W 63rd St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱			↑	↱		↑	↱
Volume (vph)	55	400	90	112	481	48	0	317	44	0	615	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	10	10	12	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	0.99			1.00	0.62		1.00	0.64
Flpb, ped/bikes	0.96	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1503	1615	1236	1517	1591			1673	782		1673	924
Flt Permitted	0.25	1.00	1.00	0.38	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	391	1615	1236	601	1591			1673	782		1673	924
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	58	421	95	118	506	51	0	334	46	0	647	82
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	58	421	95	118	557	0	0	334	46	0	647	82
Confl. Peds. (#/hr)	86		72	72		86			129			122
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	9%	4%	1%	0%	3%	0%	5%	4%	5%	2%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0			
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	39.0	39.0	39.0	39.0	39.0			44.0	44.0		44.0	44.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0			44.0	44.0		44.0	44.0
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43			0.49	0.49		0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	169	699	535	260	689			817	382		817	451
v/s Ratio Prot		0.26			c0.35			0.20			c0.39	
v/s Ratio Perm	0.15		0.08	0.20					0.06			0.09
v/c Ratio	0.34	0.60	0.18	0.45	0.81			0.41	0.12		0.79	0.18
Uniform Delay, d1	17.0	19.6	15.7	18.0	22.2			14.7	12.5		19.2	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.73	0.88		0.62	0.52
Incremental Delay, d2	5.5	3.8	0.7	5.6	9.9			1.5	0.6		6.0	0.7
Delay (s)	22.4	23.4	16.4	23.6	32.1			12.2	11.6		17.9	7.4
Level of Service	C	C	B	C	C			B	B		B	A
Approach Delay (s)		22.1			30.6			12.2			16.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1156: Ashland Ave. □ W 65th St.

8/8/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	12	22	27	0	352	0	0	494	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.94			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1847			1436			1201	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1847			1436			1201	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	13	23	28	0	371	0	0	520	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	64	0	0	371	0	0	545	0
Confl. Peds. (#/hr)			6	6		5			41			42
Confl. Bikes (#/hr)			1									3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Parking (#/hr)								10			36	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					7.8			73.2			73.2	
Effective Green, g (s)					7.8			73.2			73.2	
Actuated g/C Ratio					0.09			0.81			0.81	
Clearance Time (s)					5.0			4.0			4.0	
Vehicle Extension (s)					5.0			3.0			3.0	
Lane Grp Cap (vph)					160			1167			976	
v/s Ratio Prot								0.26			c0.45	
v/s Ratio Perm					0.03							
v/c Ratio					0.40			0.32			0.56	
Uniform Delay, d1					38.9			2.1			2.9	
Progression Factor					1.00			0.54			0.90	
Incremental Delay, d2					3.4			0.6			1.7	
Delay (s)					42.3			1.7			4.3	
Level of Service					D			A			A	
Approach Delay (s)		0.0			42.3			1.7			4.3	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1158: Ashland Ave. □ W Marquette Rd.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations	↰	↑	↱	↰	↑	↱		↱			↱	
Volume (vph)	48	340	92	112	387	30	0	345	30	0	462	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1531	1647	1300	1531	1680	1351		1180			1129	
Flt Permitted	0.35	1.00	1.00	0.35	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	567	1647	1300	557	1680	1351		1180			1129	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	51	358	97	118	407	32	0	363	32	0	486	34
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	51	358	97	118	407	32	0	395	0	0	520	0
Confl. Peds. (#/hr)	21		22	22		21			32			32
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	2%	4%	0%	0%	0%	0%	3%	0%	10%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	33.2	30.2	30.2	37.2	32.2	32.2		41.8			41.8	
Effective Green, g (s)	33.2	30.2	30.2	37.2	32.2	32.2		41.8			41.8	
Actuated g/C Ratio	0.37	0.34	0.34	0.41	0.36	0.36		0.46			0.46	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	241	552	436	284	601	483		548			524	
v/s Ratio Prot	0.01	0.22		c0.02	c0.24			0.33			c0.46	
v/s Ratio Perm	0.07		0.07	0.15		0.02						
v/c Ratio	0.21	0.65	0.22	0.42	0.68	0.07		0.72			0.99	
Uniform Delay, d1	19.1	25.4	21.5	17.7	24.5	19.0		19.4			23.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.97			0.63	
Incremental Delay, d2	0.4	5.8	1.2	1.0	6.0	0.3		7.5			34.9	
Delay (s)	19.6	31.2	22.6	18.7	30.5	19.3		26.3			49.9	
Level of Service	B	C	C	B	C	B		C			D	
Approach Delay (s)		28.4			27.4			26.3			49.9	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1160: Ashland Ave. □ W 69th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑	↱		↑	↱		↑	↱
Volume (vph)	42	291	52	64	292	34	0	278	58	0	492	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.81		1.00	0.91		1.00	0.84
Flpb, ped/bikes		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Frt		0.98			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		3037			1642	1164		1149	1342		1037	1229
Flt Permitted		0.81			0.85	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		2461			1414	1164		1149	1342		1037	1229
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	306	55	67	307	36	0	293	61	0	518	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	405	0	0	374	36	0	293	61	0	518	75
Confl. Peds. (#/hr)	91		48	48		91			52			54
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	0%	3%	10%	0%	5%	3%	6%	3%	0%	4%	4%	1%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)		29.0			29.0	29.0		52.0	52.0		52.0	52.0
Effective Green, g (s)		29.0			29.0	29.0		52.0	52.0		52.0	52.0
Actuated g/C Ratio		0.32			0.32	0.32		0.58	0.58		0.58	0.58
Clearance Time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		792			455	375		663	775		599	710
v/s Ratio Prot								0.26			c0.50	
v/s Ratio Perm		0.16			c0.26	0.03			0.05			0.06
v/c Ratio		0.51			0.82	0.10		0.44	0.08		0.86	0.11
Uniform Delay, d1		24.8			28.1	21.3		10.8	8.4		16.0	8.5
Progression Factor		1.00			1.00	1.00		1.21	1.08		0.65	0.54
Incremental Delay, d2		2.4			15.3	0.5		2.0	0.2		11.4	0.2
Delay (s)		27.1			43.5	21.8		15.0	9.3		21.8	4.8
Level of Service		C			D	C		B	A		C	A
Approach Delay (s)		27.1			41.6			14.0			19.6	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. □ W 71st St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	61	337	78	107	368	84	0	319	15	0	537	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.92		1.00			0.99	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1537	1647	1324	1551	1663	1294		1424			1494	
Flt Permitted	0.31	1.00	1.00	0.36	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	506	1647	1324	580	1663	1294		1424			1494	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	64	355	82	113	387	88	0	336	16	0	565	55
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	64	355	82	113	387	88	0	352	0	0	620	0
Confl. Peds. (#/hr)	38		31	31		38			20			29
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	2%	0%	2%	1%	1%	8%	3%	0%	7%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	32.6	28.6	28.6	32.6	28.6	28.6		45.4			45.4	
Effective Green, g (s)	32.6	28.6	28.6	32.6	28.6	28.6		45.4			45.4	
Actuated g/C Ratio	0.36	0.32	0.32	0.36	0.32	0.32		0.50			0.50	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	229	523	420	253	528	411		718			753	
v/s Ratio Prot	0.01	0.22		c0.02	c0.23			0.25			c0.42	
v/s Ratio Perm	0.09		0.06	0.14		0.07						
v/c Ratio	0.28	0.68	0.20	0.45	0.73	0.21		0.49			0.82	
Uniform Delay, d1	19.9	26.7	22.3	21.2	27.3	22.5		14.7			18.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			0.60	
Incremental Delay, d2	0.7	6.9	1.0	1.3	8.7	1.2		2.4			5.6	
Delay (s)	20.6	33.6	23.4	22.5	36.0	23.7		17.1			17.0	
Level of Service	C	C	C	C	D	C		B			B	
Approach Delay (s)		30.3			31.6			17.1			17.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1168: Ashland Ave. □ W 74th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↑	↱		↑	↱
Volume (vph)	41	157	60	49	339	88	0	260	21	0	557	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.91		1.00	0.96		1.00	0.94		1.00	0.88
Flpb, ped/bikes		1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1617	1265		1603	1373		1520	1385		1520	1204
Flt Permitted		0.83	1.00		0.94	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1352	1265		1509	1373		1520	1385		1520	1204
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	43	165	63	52	357	93	0	274	22	0	586	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	208	63	0	409	93	0	274	22	0	586	38
Confl. Peds. (#/hr)	12		44	44		12			19			44
Heavy Vehicles (%)	0%	8%	3%	0%	4%	0%	9%	3%	0%	5%	3%	8%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		28.0	28.0		28.0	28.0		38.0	38.0		38.0	38.0
Effective Green, g (s)		28.0	28.0		28.0	28.0		38.0	38.0		38.0	38.0
Actuated g/C Ratio		0.37	0.37		0.37	0.37		0.51	0.51		0.51	0.51
Clearance Time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		504	472		563	512		770	701		770	610
v/s Ratio Prot								0.18			c0.39	
v/s Ratio Perm		0.15	0.05		c0.27	0.07			0.02			0.03
v/c Ratio		0.41	0.13		0.73	0.18		0.36	0.03		0.76	0.06
Uniform Delay, d1		17.4	15.5		20.2	15.8		11.1	9.3		14.9	9.4
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.04		1.00	1.00
Incremental Delay, d2		2.5	0.6		8.0	0.8		1.2	0.1		7.0	0.2
Delay (s)		19.9	16.1		28.2	16.6		12.3	9.8		21.8	9.6
Level of Service		B	B		C	B		B	A		C	A
Approach Delay (s)		19.0			26.0			12.1			21.1	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1170: Ashland Ave. □ W 76th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↑↱			↑↱	
Volume (vph)	64	290	37	88	313	82	0	210	35	0	505	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.98			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		3044			3014			1251			1177	
Flt Permitted		0.78			0.77			1.00			1.00	
Satd. Flow (perm)		2394			2342			1251			1177	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	67	305	39	93	329	86	0	221	37	0	532	34
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	411	0	0	508	0	0	258	0	0	566	0
Confl. Peds. (#/hr)	6		20	20		6			5			8
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	3%	2%	0%	0%	2%	1%	0%	4%	0%	7%	4%	3%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			42.0			42.0	
Effective Green, g (s)		24.0			24.0			42.0			42.0	
Actuated g/C Ratio		0.32			0.32			0.56			0.56	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		766			749			700			659	
v/s Ratio Prot								0.21			c0.48	
v/s Ratio Perm		0.17			c0.22							
v/c Ratio		0.54			0.68			0.37			0.86	
Uniform Delay, d1		20.9			22.1			9.1			14.0	
Progression Factor		1.00			1.00			1.00			0.42	
Incremental Delay, d2		2.7			4.9			1.5			10.7	
Delay (s)		23.6			27.0			10.6			16.6	
Level of Service		C			C			B			B	
Approach Delay (s)		23.6			27.0			10.6			16.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	96	451	30	64	479	73	0	189	28	0	553	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.81	1.00	1.00	0.89		1.00	0.80		1.00	0.91
Flpb, ped/bikes	0.97	1.00	1.00	0.94	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1493	1585	1118	1447	1600	1210		1188	834		1166	900
Flt Permitted	0.19	1.00	1.00	0.22	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	295	1585	1118	338	1600	1210		1188	834		1166	900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	101	475	32	67	504	77	0	199	29	0	582	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	101	475	32	67	504	77	0	199	29	0	582	67
Confl. Peds. (#/hr)	54		99	99		54			68			27
Confl. Bikes (#/hr)			1			1			1			
Heavy Vehicles (%)	0%	6%	0%	0%	5%	1%	7%	4%	0%	10%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.0	34.0	34.0	34.0	34.0	34.0		50.0	50.0		50.0	50.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.50	0.50		0.50	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	100	538	380	114	544	411		594	417		583	450
v/s Ratio Prot		0.30			0.32			0.17			c0.50	
v/s Ratio Perm	c0.34		0.03	0.20		0.06			0.03			0.07
v/c Ratio	1.01	0.88	0.08	0.59	0.93	0.19		0.34	0.07		1.00	0.15
Uniform Delay, d1	33.0	31.1	22.4	27.2	31.8	23.3		15.0	13.0		25.0	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.51	1.54		1.00	1.00
Incremental Delay, d2	92.7	18.6	0.4	20.3	24.1	1.0		1.4	0.3		36.9	0.7
Delay (s)	125.7	49.8	22.9	47.5	55.9	24.3		24.1	20.2		61.8	14.2
Level of Service	F	D	C	D	E	C		C	C		E	B
Approach Delay (s)		61.0			51.3			23.6			56.9	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1175: Ashland Ave. □ W 81st St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↑			↳	
Volume (vph)	0	0	0	48	72	50	0	331	0	0	622	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)					5.0	5.0		4.0			4.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.93		1.00			0.97	
Flpb, ped/bikes					0.97	1.00		1.00			1.00	
Frt					1.00	0.85		1.00			0.98	
Flt Protected					0.98	1.00		1.00			1.00	
Satd. Flow (prot)					1602	1297		1160			1007	
Flt Permitted					0.98	1.00		1.00			1.00	
Satd. Flow (perm)					1602	1297		1160			1007	
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	0	0	0	51	76	53	0	348	0	0	655	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	127	53	0	348	0	0	780	0
Confl. Peds. (#/hr)			31	31		25			62			51
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	3%	2%	0%	0%	3%	2%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					23.0	23.0		68.0			68.0	
Effective Green, g (s)					23.0	23.0		68.0			68.0	
Actuated g/C Ratio					0.23	0.23		0.68			0.68	
Clearance Time (s)					5.0	5.0		4.0			4.0	
Lane Grp Cap (vph)					368	298		788			684	
v/s Ratio Prot								0.30			c0.77	
v/s Ratio Perm					0.08	0.04						
v/c Ratio					0.35	0.18		0.44			1.14	
Uniform Delay, d1					32.2	30.9		7.3			16.0	
Progression Factor					1.00	1.00		0.62			0.45	
Incremental Delay, d2					2.6	1.3		1.7			73.7	
Delay (s)					34.8	32.2		6.2			80.9	
Level of Service					C	C		A			F	
Approach Delay (s)		0.0			34.0			6.2			80.9	
Approach LOS		A			C			A			F	

Intersection Summary			
HCM 2000 Control Delay	54.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1177: Ashland Ave. □ W 83rd St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	75	359	105	95	355	66	0	318	52	0	627	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	0.99			1.00	0.80		1.00	0.92
Flpb, ped/bikes	0.98	1.00	1.00	0.96	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1520	1631	1248	1534	3087			1327	904		1081	862
Flt Permitted	0.39	1.00	1.00	0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	620	1631	1248	405	3087			1327	904		1081	862
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	79	378	111	100	374	69	0	335	55	0	660	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	79	378	111	100	443	0	0	335	55	0	660	43
Confl. Peds. (#/hr)	14		47	47		14			65			59
Heavy Vehicles (%)	3%	3%	2%	0%	0%	0%	2%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	27.0	27.0	27.0	27.0	27.0			64.0	64.0		64.0	64.0
Effective Green, g (s)	27.0	27.0	27.0	27.0	27.0			64.0	64.0		64.0	64.0
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.64	0.64		0.64	0.64
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	167	440	336	109	833			849	578		691	551
v/s Ratio Prot		0.23			0.14			0.25			c0.61	
v/s Ratio Perm	0.13		0.09	c0.25					0.06			0.05
v/c Ratio	0.47	0.86	0.33	0.92	0.53			0.39	0.10		0.96	0.08
Uniform Delay, d1	30.5	34.7	29.3	35.4	31.1			8.7	6.9		16.7	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.75	0.73		0.47	0.68
Incremental Delay, d2	9.3	19.2	2.6	66.1	2.4			1.3	0.3		4.1	0.0
Delay (s)	39.9	53.8	31.9	101.5	33.5			7.8	5.4		12.0	4.6
Level of Service	D	D	C	F	C			A	A		B	A
Approach Delay (s)		47.6			46.0			7.5			11.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1179: Ashland Ave. □ W 85th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	38	26	38	0	0	0	0	314	45	0	721	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.95						0.98			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1616						1147			1149	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1616						1147			1149	
Peak-hour factor, PHF	0.95	0.95	0.95	0.90	0.90	0.95	0.90	0.95	0.95	0.90	0.95	0.95
Adj. Flow (vph)	40	27	40	0	0	0	0	331	47	0	759	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	107	0	0	0	0	0	378	0	0	759	0
Confl. Peds. (#/hr)	11		5			11			19			16
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		10.0						81.0			81.0	
Effective Green, g (s)		10.0						81.0			81.0	
Actuated g/C Ratio		0.10						0.81			0.81	
Clearance Time (s)		5.0						4.0			4.0	
Vehicle Extension (s)		6.0						3.0			3.0	
Lane Grp Cap (vph)		161						929			930	
v/s Ratio Prot								0.33			c0.66	
v/s Ratio Perm		0.07										
v/c Ratio		0.66						0.41			0.82	
Uniform Delay, d1		43.4						2.7			5.3	
Progression Factor		1.00						0.99			0.63	
Incremental Delay, d2		15.1						1.2			4.1	
Delay (s)		58.5						3.9			7.5	
Level of Service		E						A			A	
Approach Delay (s)		58.5			0.0			3.9			7.5	
Approach LOS		E			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. □ W 87th St.

8/8/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	94	838	174	126	1092	157	0	297	38	0	542	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.90		1.00	0.90		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1596	3179	1207	1562	3210	1253		1262	973		1092	883
Flt Permitted	0.12	1.00	1.00	0.13	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	207	3179	1207	214	3210	1253		1262	973		1092	883
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	99	882	183	133	1149	165	0	313	40	0	571	89
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	99	882	183	133	1149	165	0	313	40	0	571	89
Confl. Peds. (#/hr)	39		56	56		39			78			22
Heavy Vehicles (%)	0%	4%	3%	2%	3%	3%	3%	2%	0%	3%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	37.2	32.4	32.4	41.4	34.6	34.6		48.6	48.6		48.6	48.6
Effective Green, g (s)	37.2	32.4	32.4	41.4	34.6	34.6		48.6	48.6		48.6	48.6
Actuated g/C Ratio	0.37	0.32	0.32	0.41	0.35	0.35		0.49	0.49		0.49	0.49
Clearance Time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	143	1029	391	182	1110	433		613	472		530	429
v/s Ratio Prot	0.03	0.28		c0.05	c0.36			0.25			c0.52	
v/s Ratio Perm	0.22		0.15	0.25		0.13			0.04			0.10
v/c Ratio	0.69	0.86	0.47	0.73	1.04	0.38		0.51	0.08		1.08	0.21
Uniform Delay, d1	24.7	31.6	26.9	21.6	32.7	24.6		17.6	13.8		25.7	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.86	0.91		0.80	0.69
Incremental Delay, d2	13.5	9.2	4.0	14.0	36.5	2.5		2.9	0.3		52.5	0.6
Delay (s)	38.3	40.8	30.9	35.6	69.2	27.2		18.0	12.8		73.1	10.8
Level of Service	D	D	C	D	E	C		B	B		E	B
Approach Delay (s)		39.0			61.3			17.4			64.7	
Approach LOS		D			E			B			E	

Intersection Summary			
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. □ W 91st St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑	↱		↑	↱
Volume (vph)	15	30	34	35	6	27	0	356	20	0	663	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.97			0.97			1.00	0.91		1.00	0.96
Flpb, ped/bikes		0.99			0.98			1.00	1.00		1.00	1.00
Frt		0.94			0.95			1.00	0.85		1.00	0.85
Flt Protected		0.99			0.97			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1515			1486			1054	1349		1166	1416
Flt Permitted		0.93			0.79			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1427			1206			1054	1349		1166	1416
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	32	36	37	6	28	0	375	21	0	698	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	84	0	0	71	0	0	375	21	0	698	8
Confl. Peds. (#/hr)	11		9	9		11			18			6
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	4%	0%	11%	3%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		12.0			12.0			79.0	79.0		79.0	79.0
Effective Green, g (s)		12.0			12.0			79.0	79.0		79.0	79.0
Actuated g/C Ratio		0.12			0.12			0.79	0.79		0.79	0.79
Clearance Time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		8.0			8.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		171			144			832	1065		921	1118
v/s Ratio Prot								0.36			c0.60	
v/s Ratio Perm		0.06			c0.06				0.02			0.01
v/c Ratio		0.49			0.49			0.45	0.02		0.76	0.01
Uniform Delay, d1		41.1			41.2			3.4	2.2		5.5	2.2
Progression Factor		1.00			1.00			1.00	1.00		0.59	0.70
Incremental Delay, d2		9.2			10.9			1.8	0.0		3.5	0.0
Delay (s)		50.3			52.1			5.2	2.3		6.8	1.6
Level of Service		D			D			A	A		A	A
Approach Delay (s)		50.3			52.1			5.0			6.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

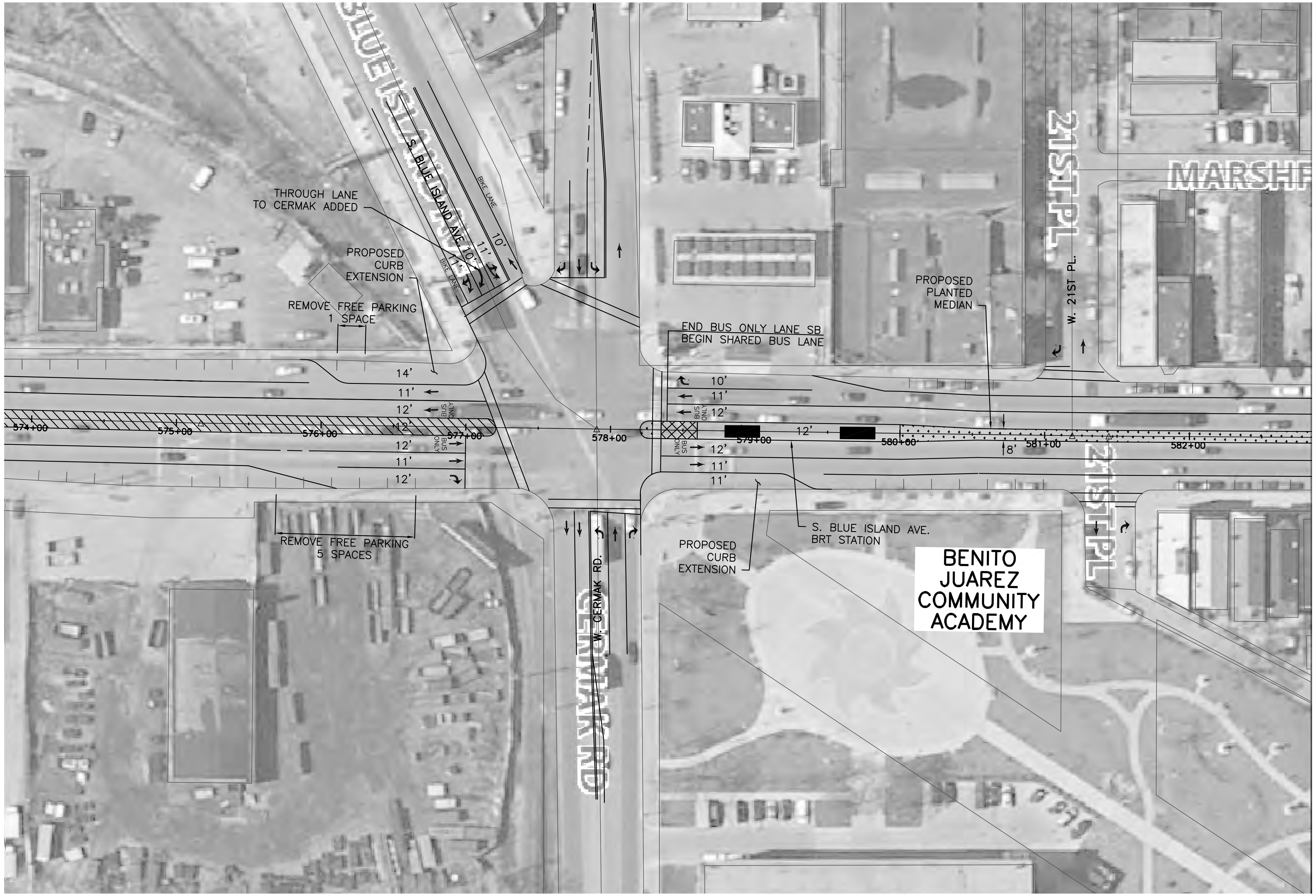
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	157	668	68	22	820	156	0	317	19	0	429	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.99			1.00	0.94		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1549	3149	1330	1584	3119			1520	1237		1520	1241
Flt Permitted	0.13	1.00	1.00	0.36	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	204	3149	1330	608	3119			1520	1237		1520	1241
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	165	703	72	23	863	164	0	334	20	0	452	119
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	165	703	72	23	1027	0	0	334	20	0	452	119
Confl. Peds. (#/hr)	30		39	39		30			52			18
Heavy Vehicles (%)	3%	5%	2%	0%	2%	4%	2%	3%	0%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	52.7	47.7	47.7	42.8	40.8			39.0	39.0		39.0	39.0
Effective Green, g (s)	52.7	47.7	47.7	42.8	40.8			39.0	39.0		39.0	39.0
Actuated g/C Ratio	0.52	0.47	0.47	0.42	0.40			0.38	0.38		0.38	0.38
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	223	1476	623	275	1251			582	474		582	475
v/s Ratio Prot	c0.06	0.22		0.00	c0.33			0.22			c0.30	
v/s Ratio Perm	0.32		0.05	0.03					0.02			0.10
v/c Ratio	0.74	0.48	0.12	0.08	0.82			0.57	0.04		0.78	0.25
Uniform Delay, d1	17.7	18.5	15.2	17.3	27.2			24.8	19.6		27.5	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	12.1	1.1	0.4	0.1	6.1			4.1	0.2		9.8	1.3
Delay (s)	29.8	19.6	15.5	17.5	33.3			28.9	19.8		37.3	22.6
Level of Service	C	B	B	B	C			C	B		D	C
Approach Delay (s)		21.1			33.0			28.3			34.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	101.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Mitigated Build Alternative Concept Plans

(Proposed Mitigations within Existing Curb-to-Curb Width)



HORIZONTAL SCALE IN FEET
0 40 80

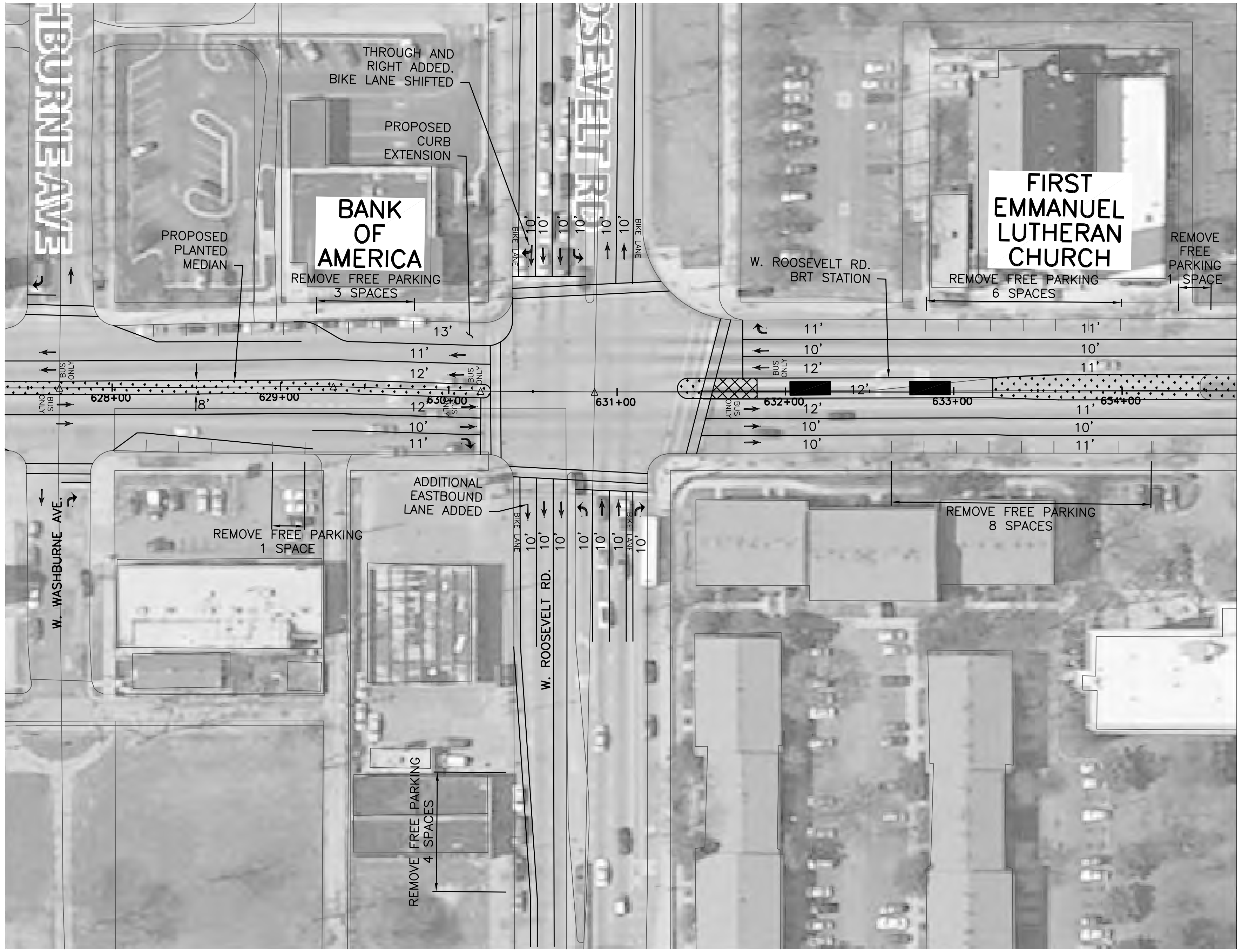
CALCULATED SMS

CHECKED SDG

MITIGATION ALTERNATIVE
CERMAK/BLUE ISLAND INTERSECTION

ASHLAND AVE. BRT

1
9


BANK OF AMERICA
FIRST EMMANUEL LUTHERAN CHURCH
W. WASHBURNE AVE.
W. ROOSEVELT RD.
THROUGH AND RIGHT ADDED. BIKE LANE SHIFTED
PROPOSED CURB EXTENSION
PROPOSED PLANTED MEDIAN
REMOVE FREE PARKING 3 SPACES
W. ROOSEVELT RD. BRT STATION
REMOVE FREE PARKING 6 SPACES
REMOVE FREE PARKING 1 SPACE
ADDITIONAL EASTBOUND LANE ADDED
REMOVE FREE PARKING 1 SPACE
REMOVE FREE PARKING 8 SPACES
REMOVE FREE PARKING 4 SPACES
BIKE LANE
BUS ONLY
628+00
629+00
630+00
631+00
632+00
633+00
634+00
13'
11'
12'
10'
8'

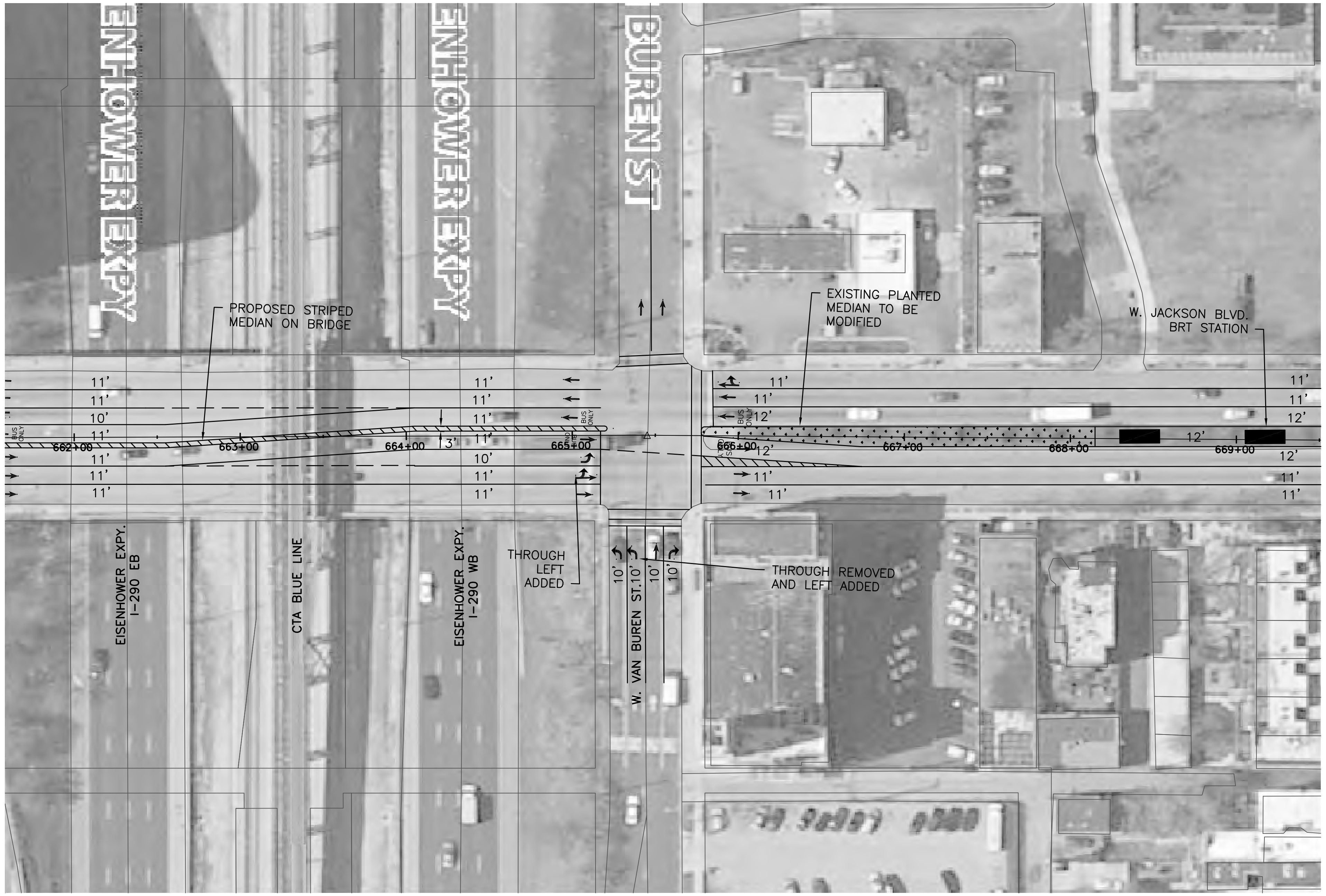
HORIZONTAL SCALE IN FEET
0 40 80

CALCULATED SMS
CHECKED SDG

MITIGATION ALTERNATIVE
ROOSEVELT INTERSECTION

ASHLAND AVE. BRT

2
9

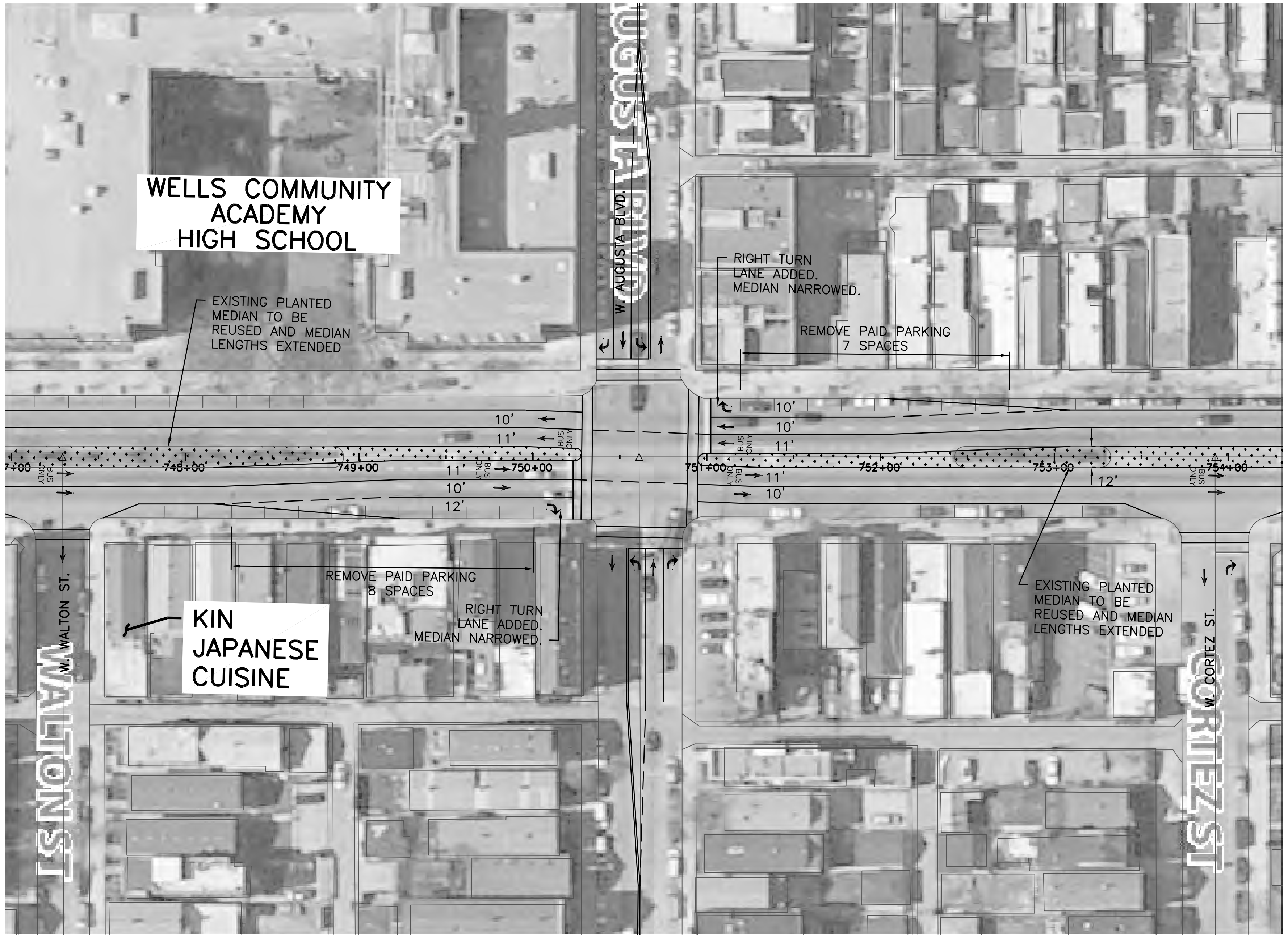


0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

MITIGATION ALTERNATIVE VAN BUREN INTERSECTION

ASHLAND AVE. BRT


WELLS COMMUNITY ACADEMY HIGH SCHOOL
AUGUSTA BLVD
W. AUGUSTA BLVD.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
RIGHT TURN LANE ADDED. MEDIAN NARROWED.
REMOVE PAID PARKING 7 SPACES
10'
11'
10'
11'
10'
12'
BUS ONLY
748+00
749+00
750+00
751+00
752+00
753+00
754+00
12'
REMOVE PAID PARKING 8 SPACES
RIGHT TURN LANE ADDED. MEDIAN NARROWED.
KIN JAPANESE CUISINE
W. WALTON ST.
WALTON ST
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. CORTEZ ST.
CORTEZ ST

0 40 80

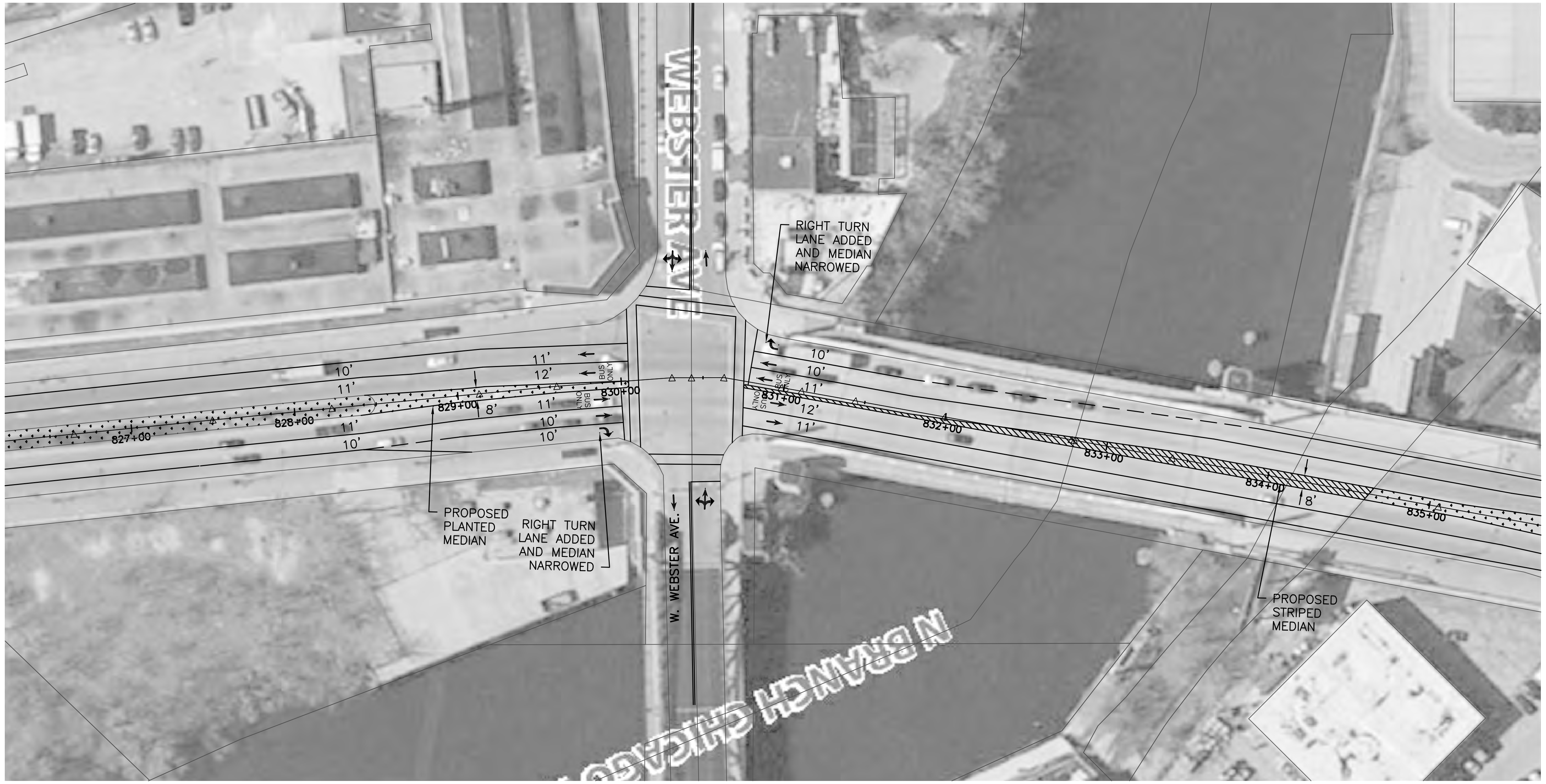
HORIZONTAL SCALE IN FEET

CALCULATED SMS

CHECKED SDG

MITIGATION ALTERNATIVE
AUGUSTA INTERSECTION

ASHLAND AVE. BRT



RIGHT TURN LANE ADDED AND MEDIAN NARROWED

PROPOSED PLANTED MEDIAN

RIGHT TURN LANE ADDED AND MEDIAN NARROWED

PROPOSED STRIPED MEDIAN

N

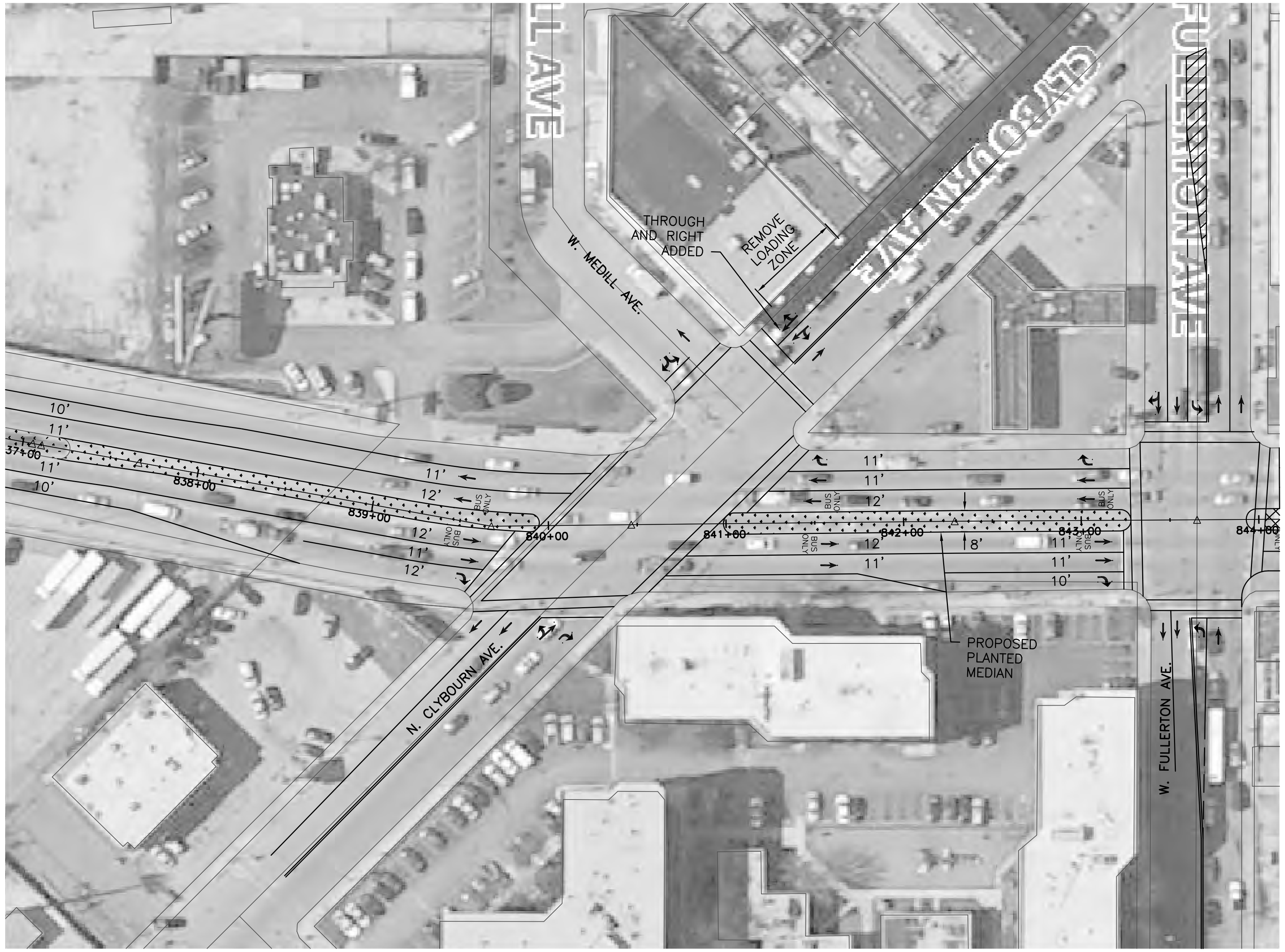
HORIZONTAL SCALE IN FEET
0 40 80

CALCULATED SMS
CHECKED SDG

MITIGATION ALTERNATIVE
WEBSTER INTERSECTION

ASHLAND AVE. BRT

5
9



N

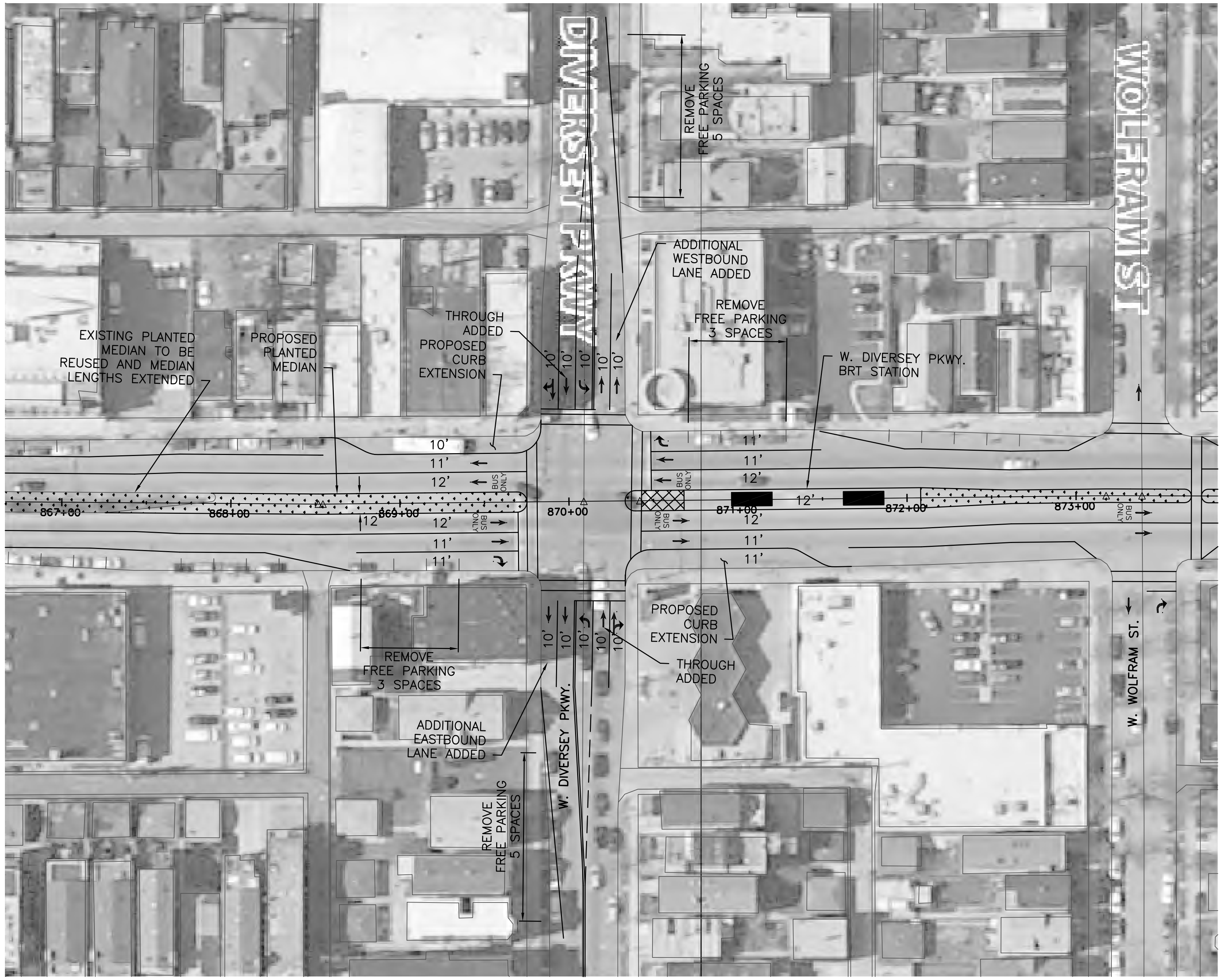
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

MITIGATION ALTERNATIVE
CLYBOURN INTERSECTION

ASHLAND AVE. BRT

6
9


DIVERSEY PKWY
WOLFRAM ST
REMOVE FREE PARKING 5 SPACES
ADDITIONAL WESTBOUND LANE ADDED
REMOVE FREE PARKING 3 SPACES
W. DIVERSEY PKWY. BRT STATION
THROUGH ADDED
PROPOSED CURB EXTENSION
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED PLANTED MEDIAN
10'
11'
12'
BUS ONLY
867+00
868+00
869+00
870+00
871+00
872+00
873+00
PROPOSED CURB EXTENSION
THROUGH ADDED
REMOVE FREE PARKING 3 SPACES
ADDITIONAL EASTBOUND LANE ADDED
REMOVE FREE PARKING 5 SPACES
W. DIVERSEY PKWY.
W. WOLFRAM ST.

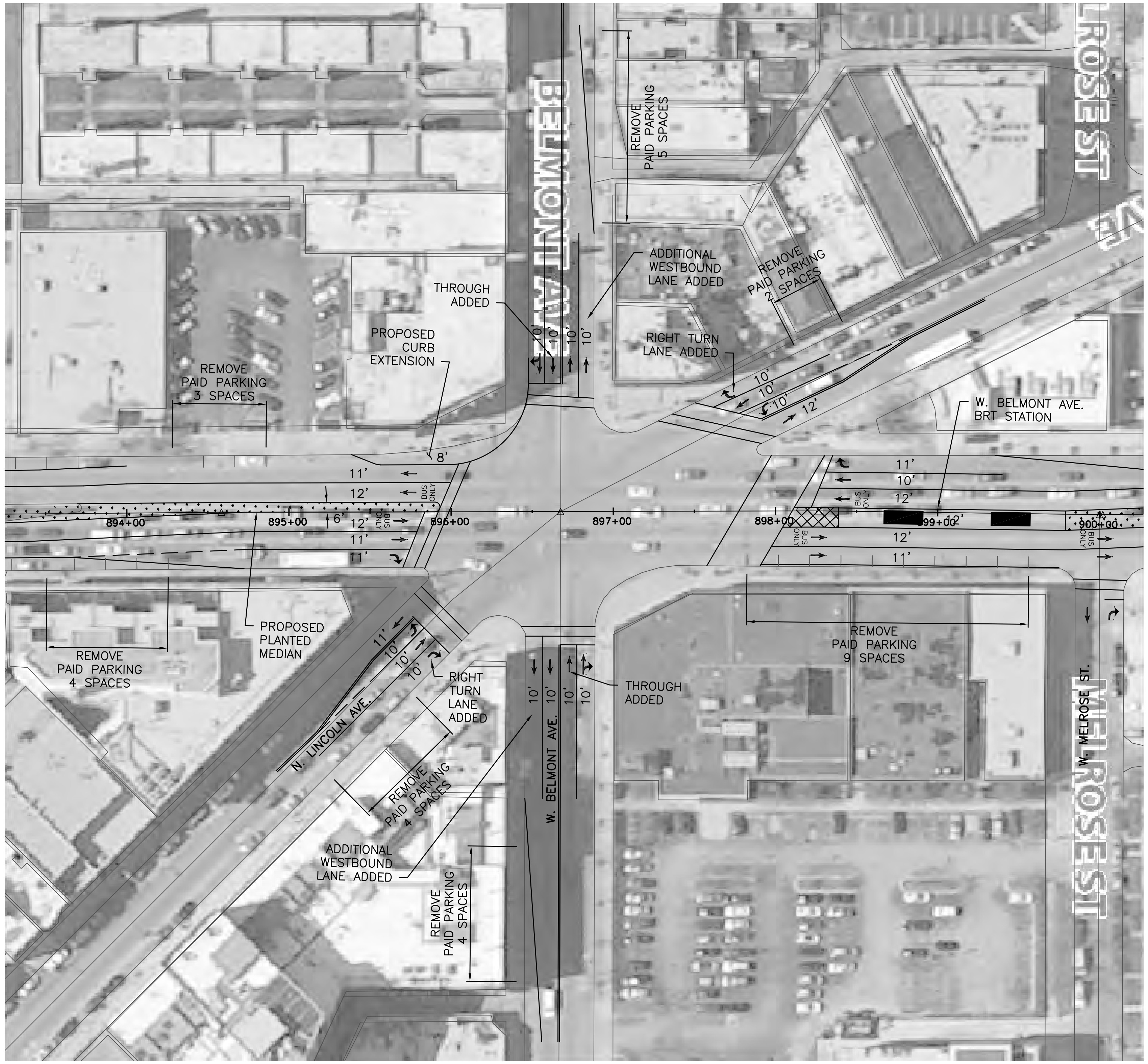
N

0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

MITIGATION ALTERNATIVE
DIVERSEY INTERSECTION

ASHLAND AVE. BRT


BELMONT AVE
MELROSE ST
LINCOLN AVE
REMOVE PAID PARKING 5 SPACES
ADDITIONAL WESTBOUND LANE ADDED
THROUGH ADDED
PROPOSED CURB EXTENSION
REMOVE PAID PARKING 2 SPACES
RIGHT TURN LANE ADDED
REMOVE PAID PARKING 3 SPACES
W. BELMONT AVE. BRT STATION
8'
11'
12'
6'
BUS ONLY
894+00
895+00
896+00
897+00
898+00
899+00
900+00
10'
PROPOSED PLANTED MEDIAN
REMOVE PAID PARKING 4 SPACES
RIGHT TURN LANE ADDED
THROUGH ADDED
REMOVE PAID PARKING 9 SPACES
N. LINCOLN AVE.
W. BELMONT AVE.
W. MELROSE ST.
REMOVE PAID PARKING 4 SPACES
ADDITIONAL WESTBOUND LANE ADDED
REMOVE PAID PARKING 4 SPACES

N

0 40 80

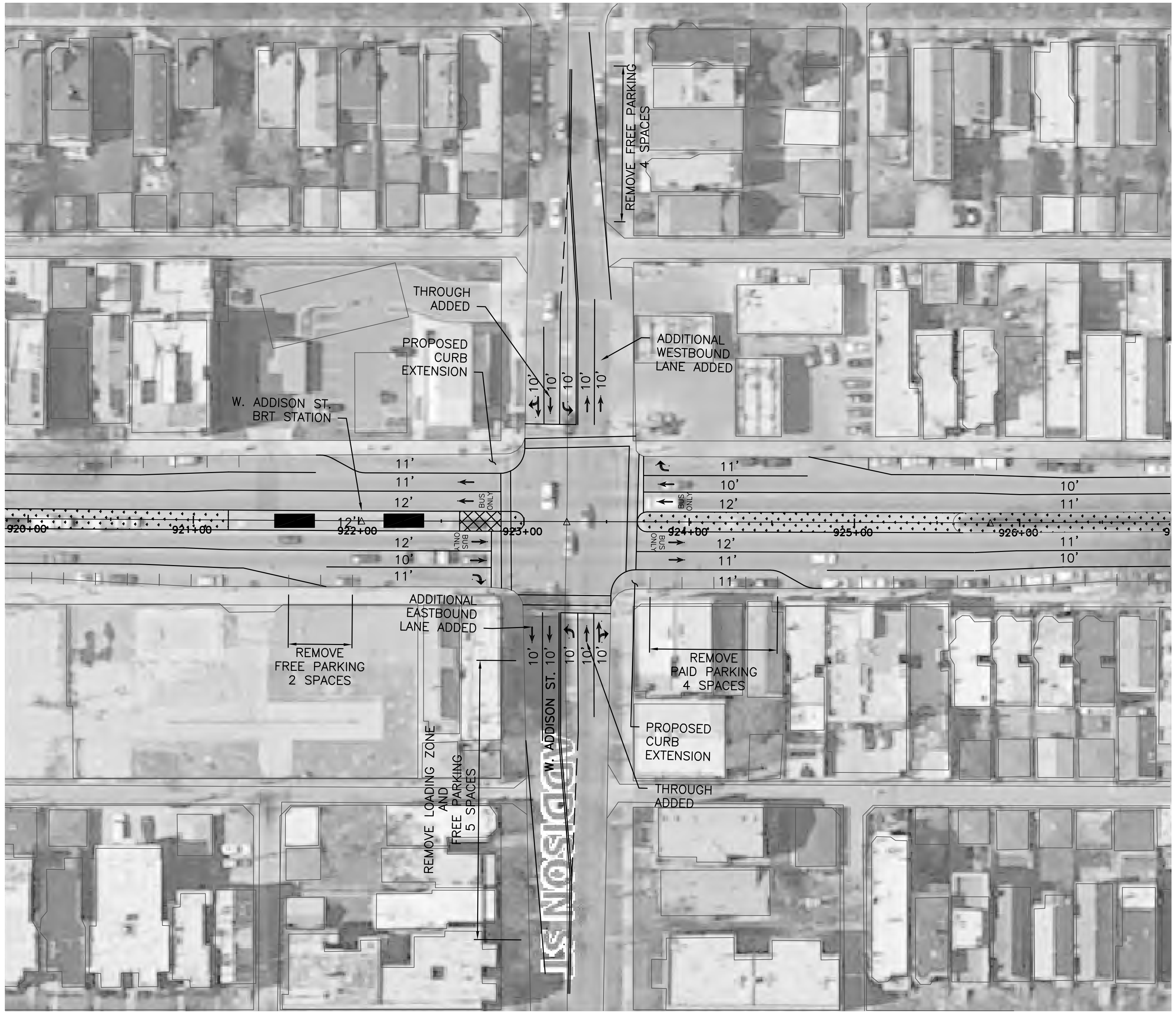
HORIZONTAL SCALE IN FEET

CALCULATED SMS

CHECKED SDG

MITIGATION ALTERNATIVE
BELMONT/LINCOLN INTERSECTION

ASHLAND AVE. BRT



0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

MITIGATION ALTERNATIVE ADDISON INTERSECTION

ASHLAND AVE. BRT

9
9

Potential Mitigation Build Alternative Level of Service Results

(Additional Potential Mitigations –

Outside of Existing Curb-to-Curb Width)

HCM Signalized Intersection Capacity Analysis
1001: Ashland Ave. & W Irving Park Rd.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↑↱			↑	↱		↑↑	↱
Volume (vph)	216	906	138	128	910	39	0	569	72	0	796	111
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91			1.00	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.50	1.00	0.98			1.00	0.63		1.00	0.79
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1559	3040	685	1542	4412			1228	622		3110	1019
Flt Permitted	0.11	1.00	1.00	0.11	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	173	3040	685	186	4412			1228	622		3110	1019
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	1.00	0.91	0.91	1.00	0.91	0.91
Adj. Flow (vph)	237	996	152	141	1000	43	0	625	79	0	875	122
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	237	996	152	141	1043	0	0	625	79	0	875	122
Confl. Peds. (#/hr)	239		202	202		239			378			144
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	2%	5%	5%	3%	1%	3%	2%	2%	6%	1%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								36	36		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	53.2	43.0	43.0	42.2	35.0			66.8	66.8		66.8	66.8
Effective Green, g (s)	53.2	43.0	43.0	42.2	35.0			66.8	66.8		66.8	66.8
Actuated g/C Ratio	0.41	0.33	0.33	0.32	0.27			0.51	0.51		0.51	0.51
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2			0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	232	1005	226	135	1187			631	319		1598	523
v/s Ratio Prot	c0.12	0.33		0.06	0.24			c0.51			0.28	
v/s Ratio Perm	c0.30		0.22	0.28					0.13			0.12
v/c Ratio	1.02	0.99	0.67	1.04	0.88			0.99	0.25		0.55	0.23
Uniform Delay, d1	37.4	43.3	37.4	38.3	45.5			31.3	17.6		21.4	17.5
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.12	1.23		1.00	1.00
Incremental Delay, d2	64.8	26.1	6.1	89.8	7.4			17.7	0.6		1.4	1.0
Delay (s)	102.2	69.4	43.5	128.1	52.9			52.8	22.3		22.7	18.5
Level of Service	F	E	D	F	D			D	C		C	B
Approach Delay (s)		72.2			61.8			49.4			22.2	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣						↱			↱	
Volume (vph)	56	92	48	0	0	0	0	722	36	0	660	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.95						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1416						1124			1208	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1416						1124			1208	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.97	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	62	101	53	0	0	0	0	793	40	0	725	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	216	0	0	0	0	0	833	0	0	733	0
Confl. Peds. (#/hr)	62		25	25		62			19			16
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	4%	3%	3%	2%	0%
Parking (#/hr)								44			38	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		22.0						100.0			100.0	
Effective Green, g (s)		22.0						100.0			100.0	
Actuated g/C Ratio		0.17						0.77			0.77	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		239						864			929	
v/s Ratio Prot								c0.74			0.61	
v/s Ratio Perm		0.15										
v/c Ratio		0.90						0.96			0.79	
Uniform Delay, d1		53.0						13.4			8.8	
Progression Factor		1.00						0.82			0.83	
Incremental Delay, d2		37.8						21.0			5.6	
Delay (s)		90.7						31.9			12.9	
Level of Service		F						C			B	
Approach Delay (s)		90.7			0.0			31.9			12.9	
Approach LOS		F			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1005: Ashland Ave. & W Addison St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	175	566	65	136	507	31	0	354	47	0	616	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.96		1.00	0.89
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1490	2838		1441	2911			1143	835		1250	940
Flt Permitted	0.33	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	511	2838		404	2911			1143	835		1250	940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	192	622	71	149	557	34	0	389	52	0	677	51
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	192	693	0	149	591	0	0	389	52	0	677	51
Confl. Peds. (#/hr)	28		11	11		28			16			49
Confl. Bikes (#/hr)			2			1			1			2
Heavy Vehicles (%)	1%	7%	0%	10%	4%	10%	8%	5%	17%	2%	3%	4%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	49.3	49.3		49.3	49.3			71.7	71.7		71.7	71.7
Effective Green, g (s)	49.3	49.3		49.3	49.3			71.7	71.7		71.7	71.7
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.55	0.55		0.55	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	193	1076		153	1103			630	460		689	518
v/s Ratio Prot		0.24			0.20			0.34			c0.54	
v/s Ratio Perm	c0.38			0.37					0.06			0.05
v/c Ratio	0.99	0.64		0.97	0.54			0.62	0.11		0.98	0.10
Uniform Delay, d1	40.2	33.1		39.7	31.4			19.8	13.9		28.5	13.8
Progression Factor	1.00	1.00		1.00	1.00			0.83	0.88		0.65	0.61
Incremental Delay, d2	62.9	1.3		64.4	0.5			3.8	0.4		22.2	0.2
Delay (s)	103.2	34.5		104.1	31.9			20.3	12.7		40.8	8.6
Level of Service	F	C		F	C			C	B		D	A
Approach Delay (s)		49.4			46.5			19.4			38.6	
Approach LOS		D			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	41.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1007: Ashland Ave. & W Roscoe St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑	↱		↑	↱
Volume (vph)	0	0	0	92	197	64	0	464	0	0	614	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	4.0
Lane Util. Factor					1.00			1.00			1.00	1.00
Frpb, ped/bikes					0.97			1.00			1.00	0.87
Flpb, ped/bikes					0.99			1.00			1.00	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1606			1428			1126	841
Flt Permitted					0.99			1.00			1.00	1.00
Satd. Flow (perm)					1606			1428			1126	841
Peak-hour factor, PHF	0.95	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	101	216	70	0	510	0	0	675	60
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	387	0	0	510	0	0	675	60
Confl. Peds. (#/hr)			13	13		43			18			20
Confl. Bikes (#/hr)			2			1						4
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	6%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								6			48	48
Turn Type				Perm	NA			NA	Perm		NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8					2			6
Actuated Green, G (s)					35.0			87.0			87.0	87.0
Effective Green, g (s)					35.0			87.0			87.0	87.0
Actuated g/C Ratio					0.27			0.67			0.67	0.67
Clearance Time (s)					4.0			4.0			4.0	4.0
Lane Grp Cap (vph)					432			955			753	562
v/s Ratio Prot								0.36			c0.60	
v/s Ratio Perm					0.24							0.07
v/c Ratio					0.90			0.53			0.90	0.11
Uniform Delay, d1					45.7			11.1			17.8	7.7
Progression Factor					1.00			1.00			0.49	0.64
Incremental Delay, d2					23.8			1.4			8.0	0.2
Delay (s)					69.5			12.5			16.7	5.0
Level of Service					E			B			B	A
Approach Delay (s)		0.0			69.5			12.5			15.7	
Approach LOS		A			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1009: Ashland Ave. & W School St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	129	280	19	16	10	10	0	457	8	0	564	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			0.99	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.99			0.96			1.00			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1590			1523			1304			1493	
Flt Permitted		0.89			0.80			1.00			1.00	
Satd. Flow (perm)		1429			1247			1304			1493	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	142	308	21	18	11	11	0	502	9	0	620	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	471	0	0	40	0	0	511	0	0	660	0
Confl. Peds. (#/hr)	24		35	35		24			24			33
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	2%	0%	5%	0%	0%	0%	0%	5%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		51.0			51.0			71.0			71.0	
Effective Green, g (s)		51.0			51.0			71.0			71.0	
Actuated g/C Ratio		0.39			0.39			0.55			0.55	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		560			489			712			815	
v/s Ratio Prot								0.39			c0.44	
v/s Ratio Perm		c0.33			0.03							
v/c Ratio		0.84			0.08			0.72			0.81	
Uniform Delay, d1		35.8			24.8			22.0			24.0	
Progression Factor		1.00			1.00			0.39			0.57	
Incremental Delay, d2		14.2			0.3			3.4			3.8	
Delay (s)		50.0			25.1			12.0			17.5	
Level of Service		D			C			B			B	
Approach Delay (s)		50.0			25.1			12.0			17.5	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↘	↙	←	↖	↖	↑	↗	↱	↓
Movement	EBL2	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT
Lane Configurations		↑↑	↱			↑↑	↱		↑	↱		↑
Volume (vph)	4	435	105	40	2	285	135	43	595	73	1	513
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	11	11	12	10	10	12	11	11	11	11
Total Lost time (s)		5.0	5.0			5.0	5.0		6.0	6.0		6.0
Lane Util. Factor		0.95	1.00			0.95	1.00		1.00	1.00		1.00
Frpb, ped/bikes		1.00	0.85			1.00	0.88		1.00	0.84		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.85			1.00	0.85		1.00	0.85		1.00
Flt Protected		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Satd. Flow (prot)		2984	1177			3128	1133		1293	916		1535
Flt Permitted		0.95	1.00			0.95	1.00		1.00	1.00		1.00
Satd. Flow (perm)		2842	1177			2980	1133		1293	916		1535
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	4	478	115	44	2	313	148	47	654	80	1	564
RTOR Reduction (vph)	0	0	60	0	0	0	60	0	0	31	0	0
Lane Group Flow (vph)	0	482	99	0	0	315	135	0	654	50	0	564
Confl. Peds. (#/hr)			51		51		42			47		
Confl. Bikes (#/hr)			8									
Heavy Vehicles (%)	0%	7%	7%	5%	0%	2%	13%	5%	5%	3%	100%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	3	0	0
Parking (#/hr)									24	24		0
Turn Type	Perm	NA	Perm		Perm	NA	Perm		NA	Perm		NA
Protected Phases		10				14			2			6
Permitted Phases	10		10		14		14			2		
Actuated Green, G (s)		27.0	27.0			27.0	27.0		70.0	70.0		70.0
Effective Green, g (s)		27.0	27.0			27.0	27.0		70.0	70.0		70.0
Actuated g/C Ratio		0.21	0.21			0.21	0.21		0.54	0.54		0.54
Clearance Time (s)		5.0	5.0			5.0	5.0		6.0	6.0		6.0
Lane Grp Cap (vph)		590	244			618	235		696	493		826
v/s Ratio Prot									c0.51			0.37
v/s Ratio Perm		c0.17	0.08			0.11	0.12			0.05		
v/c Ratio		0.82	0.40			0.51	0.57		0.94	0.10		0.68
Uniform Delay, d1		49.1	44.5			45.6	46.3		28.0	14.6		21.9
Progression Factor		1.00	1.00			1.00	1.00		0.49	0.18		0.51
Incremental Delay, d2		11.9	4.9			3.0	9.8		17.1	0.3		2.7
Delay (s)		61.0	49.5			48.6	56.1		31.0	3.0		14.0
Level of Service		E	D			D	E		C	A		B
Approach Delay (s)		58.2				51.5			27.9			13.9
Approach LOS		E				D			C			B

Intersection Summary			
HCM 2000 Control Delay	48.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	114.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. & N. Lincoln Ave. & W Belmont Ave.

Movement	SBR	SEL	SET	SER	SER2	NWL2	NWL	NWT	NWR	NWR2
Lane Configurations	↱	↰	↑↑	↱			↰	↑↑	↱	
Volume (vph)	24	27	342	111	1	7	16	240	61	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	9	10	10	11	12	9	10	10	11
Total Lost time (s)	6.0	6.0	6.0	6.0			6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	0.95	1.00			1.00	0.95	1.00	
Frpb, ped/bikes	0.94	1.00	1.00	1.00			1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt	0.85	1.00	1.00	0.85			1.00	1.00	0.85	
Flt Protected	1.00	0.95	1.00	1.00			0.95	1.00	1.00	
Satd. Flow (prot)	1391	1386	3099	1374			1539	3160	1388	
Flt Permitted	1.00	0.46	1.00	1.00			0.26	1.00	1.00	
Satd. Flow (perm)	1391	669	3099	1374			424	3160	1388	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	26	30	376	122	1	8	18	264	67	3
RTOR Reduction (vph)	0	0	0	59	0	0	0	0	59	0
Lane Group Flow (vph)	26	30	376	64	0	0	26	264	11	0
Confl. Peds. (#/hr)	26									
Confl. Bikes (#/hr)										
Heavy Vehicles (%)	0%	11%	3%	4%	0%	0%	0%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Turn Type	Perm	Perm	NA	Perm		Perm	Perm	NA	Perm	
Protected Phases			4					8		
Permitted Phases	6	4		4		8	8		8	
Actuated Green, G (s)	70.0	16.0	16.0	16.0			16.0	16.0	16.0	
Effective Green, g (s)	70.0	16.0	16.0	16.0			16.0	16.0	16.0	
Actuated g/C Ratio	0.54	0.12	0.12	0.12			0.12	0.12	0.12	
Clearance Time (s)	6.0	6.0	6.0	6.0			6.0	6.0	6.0	
Lane Grp Cap (vph)	749	82	381	169			52	388	170	
v/s Ratio Prot			c0.12					0.08		
v/s Ratio Perm	0.02	0.04		0.05			0.06		0.01	
v/c Ratio	0.03	0.37	0.99	0.38			0.50	0.68	0.07	
Uniform Delay, d1	14.1	52.3	56.9	52.4			53.3	54.6	50.4	
Progression Factor	0.85	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2	0.1	12.1	42.9	6.4			30.5	9.3	0.7	
Delay (s)	12.0	64.5	99.8	58.8			83.7	63.8	51.1	
Level of Service	B	E	F	E			F	E	D	
Approach Delay (s)			88.3					62.8		
Approach LOS			F					E		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1012: Ashland Ave. & W Barry Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣			↑			↱	
Volume (vph)	0	0	0	146	179	5	0	633	0	0	591	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					1.00			1.00			0.97	
Flpb, ped/bikes					0.98			1.00			1.00	
Frt					1.00			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1919			1333			1220	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1919			1333			1220	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	160	197	5	0	696	0	0	649	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	362	0	0	696	0	0	716	0
Confl. Peds. (#/hr)			19	19		54			130			48
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%	0%	7%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								16			30	30
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					31.0			91.0			91.0	
Effective Green, g (s)					31.0			91.0			91.0	
Actuated g/C Ratio					0.24			0.70			0.70	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					457			933			854	
v/s Ratio Prot								0.52			c0.59	
v/s Ratio Perm					0.19							
v/c Ratio					0.79			0.75			0.84	
Uniform Delay, d1					46.5			12.2			14.2	
Progression Factor					1.00			0.26			0.75	
Incremental Delay, d2					13.2			4.2			7.5	
Delay (s)					59.6			7.4			18.1	
Level of Service					E			A			B	
Approach Delay (s)		0.0			59.6			7.4			18.1	
Approach LOS		A			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. & W Wellington Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	52	141	112	0	0	0	0	524	35	0	568	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.95						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1656						1259			1433	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1656						1259			1433	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	57	155	123	0	0	0	0	576	38	0	624	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	335	0	0	0	0	0	614	0	0	636	0
Confl. Peds. (#/hr)	8		1			8			1			2
Heavy Vehicles (%)	4%	1%	0%	0%	0%	0%	2%	13%	0%	0%	4%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		38.0						84.0			84.0	
Effective Green, g (s)		38.0						84.0			84.0	
Actuated g/C Ratio		0.29						0.65			0.65	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		484						813			925	
v/s Ratio Prot								c0.49			0.44	
v/s Ratio Perm		0.20										
v/c Ratio		0.69						0.76			0.69	
Uniform Delay, d1		40.8						15.9			14.6	
Progression Factor		1.00						0.62			1.18	
Incremental Delay, d2		7.9						5.1			2.2	
Delay (s)		48.7						15.0			19.5	
Level of Service		D						B			B	
Approach Delay (s)		48.7			0.0			15.0			19.5	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1018: Ashland Ave. & W Diversey Pkwy.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↑	↱		↑↑	↱
Volume (vph)	184	733	75	144	480	68	0	602	79	0	995	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.89		1.00	0.66
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1523	2997		1577	3010			2225	522		2979	934
Flt Permitted	0.26	1.00		0.17	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	420	2997		288	3010			2225	522		2979	934
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	202	805	82	158	527	75	0	662	87	0	1093	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	202	887	0	158	602	0	0	662	87	0	1093	63
Confl. Peds. (#/hr)	44		31	31		44			20			76
Confl. Bikes (#/hr)			5			2			3			1
Heavy Vehicles (%)	4%	4%	3%	1%	2%	3%	0%	7%	10%	4%	1%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								92	92		16	
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	63.0	48.0		55.0	43.0			59.0	59.0		59.0	59.0
Effective Green, g (s)	63.0	48.0		55.0	43.0			59.0	59.0		59.0	59.0
Actuated g/C Ratio	0.48	0.37		0.42	0.33			0.45	0.45		0.45	0.45
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	347	1106		240	995			1009	236		1352	423
v/s Ratio Prot	c0.08	c0.30		c0.06	0.20			0.30			c0.37	
v/s Ratio Perm	0.21			0.22					0.17			0.07
v/c Ratio	0.58	0.80		0.66	0.61			0.66	0.37		0.81	0.15
Uniform Delay, d1	21.6	36.7		26.2	36.4			27.6	23.3		30.6	20.8
Progression Factor	1.00	1.00		1.00	1.00			0.93	1.00		1.11	1.21
Incremental Delay, d2	7.0	6.2		13.3	2.7			0.3	0.4		4.9	0.7
Delay (s)	28.6	42.9		39.5	39.1			26.1	23.8		38.8	25.8
Level of Service	C	D		D	D			C	C		D	C
Approach Delay (s)		40.2			39.2			25.8			38.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1019: Ashland Ave. & W Wrightwood Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↱	
Volume (vph)	32	205	98	102	128	15	0	634	53	0	677	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.99			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1531			1557			1151			1527	
Flt Permitted		0.95			0.52			1.00			1.00	
Satd. Flow (perm)		1459			830			1151			1527	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	35	225	108	112	141	16	0	697	58	0	744	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	368	0	0	269	0	0	755	0	0	771	0
Confl. Peds. (#/hr)	12		2	2		12			4			3
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	1%	2%	0%	0%	6%	6%	4%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			82.0			82.0	
Effective Green, g (s)		40.0			40.0			82.0			82.0	
Actuated g/C Ratio		0.31			0.31			0.63			0.63	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		448			255			726			963	
v/s Ratio Prot								c0.66			0.50	
v/s Ratio Perm		0.25			c0.32							
v/c Ratio		0.82			1.05			1.04			0.80	
Uniform Delay, d1		41.7			45.0			24.0			17.9	
Progression Factor		1.00			1.00			0.51			1.14	
Incremental Delay, d2		15.5			71.5			39.4			4.2	
Delay (s)		57.2			116.5			51.7			24.6	
Level of Service		E			F			D			C	
Approach Delay (s)		57.2			116.5			51.7			24.6	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1023: Ashland Ave. & W Fullerton Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	124	630	7	164	476	15	0	506	54	0	596	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0		2.0	5.0	5.0		5.0	5.0		5.0	2.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94		1.00	0.92		1.00	0.88
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1475	3034		1505	1631	1288		1431	1115		1535	1157
Flt Permitted	0.19	1.00		0.21	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	295	3034		329	1631	1288		1431	1115		1535	1157
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	136	692	8	180	523	16	0	556	59	0	655	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	136	700	0	180	523	16	0	556	59	0	655	125
Confl. Peds. (#/hr)	20		24	24		20			39			38
Confl. Bikes (#/hr)			5			1			2			3
Heavy Vehicles (%)	8%	5%	0%	2%	3%	0%	0%	7%	6%	9%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	pm+ov
Protected Phases	7	4		3	8			2 10			6	7
Permitted Phases	4			8		8			2 10			6
Actuated Green, G (s)	47.1	41.1		54.0	46.0	46.0		66.0	66.0		63.0	69.0
Effective Green, g (s)	47.1	41.1		54.0	46.0	46.0		64.0	64.0		63.0	69.0
Actuated g/C Ratio	0.36	0.32		0.42	0.35	0.35		0.49	0.49		0.48	0.53
Clearance Time (s)	2.0	5.0		2.0	5.0	5.0					5.0	2.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	161	959		235	577	455		704	548		743	614
v/s Ratio Prot	c0.04	0.23		c0.06	c0.32			c0.39			c0.43	0.01
v/s Ratio Perm	0.27			0.25		0.01			0.05			0.10
v/c Ratio	0.84	0.73		0.77	0.91	0.04		0.79	0.11		0.88	0.20
Uniform Delay, d1	37.8	39.5		27.4	40.0	27.5		27.4	17.7		30.1	16.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.22	0.25		0.95	1.06
Incremental Delay, d2	31.3	4.9		13.8	20.4	0.1		4.8	0.2		8.4	0.1
Delay (s)	69.0	44.4		41.2	60.3	27.6		10.8	4.6		37.2	17.1
Level of Service	E	D		D	E	C		B	A		D	B
Approach Delay (s)		48.4			54.8			10.2			34.0	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1024: Medill Ave. & Ashland Ave. & N Clybourn Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL2	WBT	WBR	NBT	NBR	SBT	SBR	SBR2	NEL
Lane Configurations		↑↱			↰↑↱		↱		↱			⤧
Volume (vph)	4	615	176	18	209	46	542	32	731	11	1	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	11	11	11	11	11	11	11	11	11	16
Total Lost time (s)		5.0			5.0		5.0		5.0			
Lane Util. Factor		0.95			0.95		1.00		1.00			
Frpb, ped/bikes		0.99			1.00		1.00		1.00			
Flpb, ped/bikes		1.00			1.00		1.00		1.00			
Frt		0.97			0.97		0.99		1.00			
Flt Protected		1.00			1.00		1.00		1.00			
Satd. Flow (prot)		3166			3046		1425		1481			
Flt Permitted		0.95			0.87		1.00		1.00			
Satd. Flow (perm)		3020			2654		1425		1481			
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.92
Adj. Flow (vph)	4	676	193	20	230	51	596	35	803	12	1	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	873	0	0	301	0	631	0	816	0	0	0
Confl. Peds. (#/hr)	2		14			2		4				
Heavy Vehicles (%)	0%	0%	0%	0%	5%	7%	9%	6%	2%	0%	0%	2%
Parking (#/hr)							0		6			
Turn Type	Perm	NA		Perm	NA		NA		NA			
Protected Phases		4			8		2		6			10
Permitted Phases	4			8								
Actuated Green, G (s)		55.0			55.0		65.0		65.0			
Effective Green, g (s)		55.0			55.0		65.0		65.0			
Actuated g/C Ratio		0.42			0.42		0.50		0.50			
Clearance Time (s)		5.0			5.0		5.0		5.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		1277			1122		712		740			
v/s Ratio Prot							0.44		c0.55			
v/s Ratio Perm		c0.29			0.11							
v/c Ratio		0.68			0.27		0.89		1.10			
Uniform Delay, d1		30.4			24.4		29.2		32.5			
Progression Factor		1.00			1.00		1.00		0.65			
Incremental Delay, d2		3.0			0.6		15.2		57.0			
Delay (s)		33.4			25.0		44.4		78.1			
Level of Service		C			C		D		E			
Approach Delay (s)		33.4			25.0		44.4		78.1			0.0
Approach LOS		C			C		D		E			A

Intersection Summary			
HCM 2000 Control Delay	49.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↑↑↱			↑	↱		↑	↱
Volume (vph)	48	226	3	152	263	14	0	551	86	0	671	104
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00			1.00	0.97		1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00			1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.98			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1664	1387		3114			1374	1256		1506	1443
Flt Permitted		0.84	1.00		0.63			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1402	1387		1999			1374	1256		1506	1443
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	53	248	3	167	289	15	0	605	95	0	737	114
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	301	3	0	471	0	0	605	95	0	737	114
Confl. Peds. (#/hr)	4		4	4		4			2			7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	14%	2%	10%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		31.0	31.0		31.0			61.0	61.0		61.0	61.0
Effective Green, g (s)		31.0	31.0		31.0			61.0	61.0		61.0	61.0
Actuated g/C Ratio		0.31	0.31		0.31			0.61	0.61		0.61	0.61
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		434	429		619			838	766		918	880
v/s Ratio Prot								0.44			c0.49	
v/s Ratio Perm		0.21	0.00		c0.24				0.08			0.08
v/c Ratio		0.69	0.01		0.76			0.72	0.12		0.80	0.13
Uniform Delay, d1		30.3	23.9		31.2			13.6	8.2		14.9	8.3
Progression Factor		1.00	1.00		1.00			1.48	1.73		1.00	1.00
Incremental Delay, d2		8.8	0.0		8.6			3.3	0.2		7.4	0.3
Delay (s)		39.1	23.9		39.7			23.5	14.5		22.3	8.6
Level of Service		D	C		D			C	B		C	A
Approach Delay (s)		39.0			39.7			22.2			20.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↑	↱		↑↱			↑↱	
Volume (vph)	0	581	59	4	118	80	0	567	1	0	824	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0	3.0		4.0			3.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00	0.98		1.00	0.97		1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1647	1323		1943	1438		1506			1550	
Flt Permitted		1.00	1.00		0.86	1.00		1.00			1.00	
Satd. Flow (perm)		1647	1323		1679	1438		1506			1550	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	638	65	4	130	88	0	623	1	0	905	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	638	65	0	134	88	0	624	0	0	908	0
Confl. Peds. (#/hr)	9		10	10		9						
Heavy Vehicles (%)	0%	2%	2%	0%	5%	3%	0%	4%	0%	5%	1%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	custom		NA			NA	
Protected Phases		4			8	1		2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		37.0	37.0		37.0	41.0		48.0			56.0	
Effective Green, g (s)		37.0	37.0		37.0	41.0		48.0			56.0	
Actuated g/C Ratio		0.37	0.37		0.37	0.41		0.48			0.56	
Clearance Time (s)		4.0	4.0		4.0	3.0		4.0			3.0	
Lane Grp Cap (vph)		609	489		621	589		722			868	
v/s Ratio Prot		c0.39				0.01		0.41			c0.59	
v/s Ratio Perm			0.05		0.08	0.06						
v/c Ratio		1.05	0.13		0.22	0.15		0.86			1.05	
Uniform Delay, d1		31.5	20.9		21.6	18.5		23.1			22.0	
Progression Factor		1.00	1.00		1.00	1.00		0.60			0.71	
Incremental Delay, d2		49.5	0.6		0.8	0.5		10.0			36.4	
Delay (s)		81.0	21.4		22.4	19.1		23.9			52.0	
Level of Service		F	C		C	B		C			D	
Approach Delay (s)		75.5			21.1			23.9			52.0	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	48.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1027: Ashland Ave. & W Armitage Ave.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱			↰		↰	↱			↑	↱
Volume (vph)	462	408	57	7	197	0	85	261	10	0	492	239
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Lane Util. Factor	0.97	1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	0.97
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.98			1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	2997	1555			1933		1545	1332			1689	1260
Flt Permitted	0.95	1.00			0.97		0.25	1.00			1.00	1.00
Satd. Flow (perm)	2997	1555			1884		413	1332			1689	1260
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	508	448	63	8	216	0	93	287	11	0	541	263
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	508	511	0	0	224	0	93	298	0	0	541	263
Confl. Peds. (#/hr)	11		2	2		11	7		3			7
Heavy Vehicles (%)	7%	6%	4%	14%	5%	0%	7%	16%	0%	11%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)								0				0
Turn Type	Prot	NA		Perm	NA		pm+pt	NA			NA	pm+ov
Protected Phases	7	4			8		5	2			6	7
Permitted Phases				8			2					6
Actuated Green, G (s)	20.0	38.4			15.4		52.6	52.6			45.5	65.5
Effective Green, g (s)	20.0	38.4			15.4		52.6	52.6			45.5	65.5
Actuated g/C Ratio	0.20	0.38			0.15		0.53	0.53			0.46	0.66
Clearance Time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	599	597			290		274	700			768	825
v/s Ratio Prot	0.17	c0.33					0.02	c0.22			c0.32	0.06
v/s Ratio Perm					0.12		0.16					0.15
v/c Ratio	0.85	0.86			0.77		0.34	0.43			0.70	0.32
Uniform Delay, d1	38.5	28.3			40.6		14.6	14.5			21.9	7.5
Progression Factor	1.00	1.00			1.00		1.09	0.98			1.36	1.09
Incremental Delay, d2	10.8	11.6			12.0		0.2	0.6			1.5	0.1
Delay (s)	49.3	39.8			52.6		16.2	14.7			31.2	8.2
Level of Service	D	D			D		B	B			C	A
Approach Delay (s)		44.6			52.6			15.1			23.7	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1029: Ashland Ave. & W Cortland St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰↑↱			↑	↱		↑	↱
Volume (vph)	0	279	20	100	122	4	0	497	91	0	440	92
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.90		0.99			1.00	0.84		1.00	0.90
Flpb, ped/bikes		1.00	1.00		0.98			1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		0.98			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1667	1308		1581			934	1204		1520	1337
Flt Permitted		1.00	1.00		0.55			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1667	1308		889			934	1204		1520	1337
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	0	307	22	110	134	4	0	546	100	0	484	101
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	307	22	0	248	0	0	546	100	0	484	101
Confl. Peds. (#/hr)	159		27	27		159			52			28
Heavy Vehicles (%)	0%	8%	5%	6%	11%	0%	0%	8%	3%	50%	3%	0%
Parking (#/hr)								64			0	
Turn Type		NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases			4	8					2			6
Actuated Green, G (s)		33.0	33.0		33.0			58.0	58.0		58.0	58.0
Effective Green, g (s)		33.0	33.0		33.0			58.0	58.0		58.0	58.0
Actuated g/C Ratio		0.33	0.33		0.33			0.58	0.58		0.58	0.58
Clearance Time (s)		5.0	5.0		5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		550	431		293			541	698		881	775
v/s Ratio Prot		0.18						c0.58			0.32	
v/s Ratio Perm			0.02		c0.28				0.08			0.08
v/c Ratio		0.56	0.05		0.85			1.01	0.14		0.55	0.13
Uniform Delay, d1		27.5	22.8		31.1			21.0	9.6		12.9	9.5
Progression Factor		1.00	1.00		1.00			0.69	0.64		0.56	0.69
Incremental Delay, d2		4.1	0.2		19.6			38.0	0.4		1.9	0.3
Delay (s)		31.6	23.1		50.8			52.4	6.5		9.1	6.8
Level of Service		C	C		D			D	A		A	A
Approach Delay (s)		31.0			50.8			45.3			8.7	
Approach LOS		C			D			D			A	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1030: Ashland Ave. & W Wabansia Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	34	4	130	24	10	18	0	483	6	0	401	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.90			0.95			1.00			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1397			1103			1228			1513	
Flt Permitted		0.93			0.83			1.00			1.00	
Satd. Flow (perm)		1317			940			1228			1513	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	37	4	143	26	11	20	0	531	7	0	441	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	184	0	0	57	0	0	538	0	0	450	0
Confl. Peds. (#/hr)	1		20	20		1			4			1
Heavy Vehicles (%)	0%	0%	1%	42%	0%	56%	8%	9%	0%	0%	3%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		19.8			19.8			72.2			72.2	
Effective Green, g (s)		19.8			19.8			72.2			72.2	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		260			186			886			1092	
v/s Ratio Prot								c0.44			0.30	
v/s Ratio Perm		c0.14			0.06							
v/c Ratio		0.71			0.31			0.61			0.41	
Uniform Delay, d1		37.4			34.2			6.9			5.5	
Progression Factor		1.00			1.00			0.39			1.11	
Incremental Delay, d2		10.6			2.0			1.9			0.9	
Delay (s)		48.0			36.2			4.6			7.0	
Level of Service		D			D			A			A	
Approach Delay (s)		48.0			36.2			4.6			7.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↑	↱		↑	↱
Volume (vph)	84	684	33	92	455	19	0	521	88	0	516	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1338	3923		1507	4313			1129	971		1166	910
Flt Permitted	0.36	1.00		0.20	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	509	3923		318	4313			1129	971		1166	910
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	92	752	36	101	500	21	0	573	97	0	567	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	92	788	0	101	521	0	0	573	97	0	567	31
Confl. Peds. (#/hr)			13	13					10			27
Heavy Vehicles (%)	15%	12%	6%	2%	2%	0%	2%	14%	8%	0%	3%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	30.6	25.0		30.6	25.0			58.4	58.4		58.4	58.4
Effective Green, g (s)	30.6	25.0		30.6	25.0			58.4	58.4		58.4	58.4
Actuated g/C Ratio	0.31	0.25		0.31	0.25			0.58	0.58		0.58	0.58
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	202	980		163	1078			659	567		680	531
v/s Ratio Prot	0.03	c0.20		c0.03	0.12			c0.51			0.49	
v/s Ratio Perm	0.11			0.15					0.10			0.03
v/c Ratio	0.46	0.80		0.62	0.48			0.87	0.17		0.83	0.06
Uniform Delay, d1	26.0	35.2		26.5	32.0			17.6	9.6		16.9	9.0
Progression Factor	1.00	1.00		1.00	1.00			1.25	1.32		0.64	0.57
Incremental Delay, d2	1.6	7.0		6.8	1.6			11.7	0.5		11.0	0.2
Delay (s)	27.6	42.2		33.3	33.5			33.6	13.2		21.8	5.3
Level of Service	C	D		C	C			C	B		C	A
Approach Delay (s)		40.7			33.5			30.6			21.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1039: Ashland Ave. & W Blackhawk St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	49	72	11	50	24	44	0	543	30	0	579	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	11	11	11	11	11	11
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.97			1.00			1.00	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.99			0.95			0.99			1.00	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1928			1549			1103			1386	
Flt Permitted		0.87			0.85			1.00			1.00	
Satd. Flow (perm)		1718			1340			1103			1386	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	54	79	12	55	26	48	0	597	33	0	636	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	145	0	0	129	0	0	630	0	0	648	0
Confl. Peds. (#/hr)	24		9	9		24			9			19
Heavy Vehicles (%)	0%	0%	9%	0%	0%	2%	4%	5%	0%	1%	5%	9%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			70.0			70.0	
Effective Green, g (s)		24.0			24.0			70.0			70.0	
Actuated g/C Ratio		0.24			0.24			0.70			0.70	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		412			321			772			970	
v/s Ratio Prot								c0.57			0.47	
v/s Ratio Perm		0.08			c0.10							
v/c Ratio		0.35			0.40			0.82			0.67	
Uniform Delay, d1		31.5			32.0			10.5			8.5	
Progression Factor		1.00			1.00			0.40			0.65	
Incremental Delay, d2		2.4			3.7			8.5			2.5	
Delay (s)		33.9			35.7			12.7			8.0	
Level of Service		C			D			B			A	
Approach Delay (s)		33.9			35.7			12.7			8.0	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1042: Ashland Ave. & N Milwaukee Ave.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations	↰	↱			↑	↱		↱			↱	
Volume (vph)	13	372	83	0	176	51	0	423	13	0	594	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	11	11	8	11	11	11
Total Lost time (s)	5.0	5.0			5.0	3.0		5.0			5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.93		1.00			1.00	
Flpb, ped/bikes	0.95	1.00			1.00	1.00		1.00			1.00	
Frt	1.00	0.97			1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1522	1601			1642	1252		1593			1520	
Flt Permitted	0.64	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)	1019	1601			1642	1252		1593			1520	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.91	0.91	0.90	0.91	0.91
Adj. Flow (vph)	14	409	91	0	193	56	0	465	14	0	653	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	14	500	0	0	193	56	0	479	0	0	653	0
Confl. Peds. (#/hr)	40		24			40			4			11
Heavy Vehicles (%)	0%	5%	5%	0%	6%	10%	8%	9%	0%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4					3 8						
Actuated Green, G (s)	36.0	36.0			40.0	40.0		50.0			50.0	
Effective Green, g (s)	36.0	36.0			40.0	40.0		50.0			50.0	
Actuated g/C Ratio	0.36	0.36			0.40	0.40		0.50			0.50	
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)	366	576			656	500		796			760	
v/s Ratio Prot		c0.31			c0.12			0.30			c0.43	
v/s Ratio Perm	0.01					0.04						
v/c Ratio	0.04	0.87			0.29	0.11		0.60			0.86	
Uniform Delay, d1	20.8	29.8			20.4	18.8		17.9			21.9	
Progression Factor	1.00	1.00			1.00	1.00		0.55			1.17	
Incremental Delay, d2	0.2	16.2			1.1	0.5		2.2			10.2	
Delay (s)	21.0	45.9			21.5	19.3		12.1			35.8	
Level of Service	C	D			C	B		B			D	
Approach Delay (s)		45.3			21.0			12.1			35.8	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1043: Ashland Ave. & W Division St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	131	706	54	141	442	42	0	525	141	0	454	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.83	1.00	1.00	0.79		1.00	0.82		1.00	0.87
Flpb, ped/bikes	0.90	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1459	3179	1200	1631	3160	1124		1395	1149		1550	1147
Flt Permitted	0.48	1.00	1.00	0.15	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	729	3179	1200	253	3160	1124		1395	1149		1550	1147
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.93	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	144	776	59	155	486	46	0	577	155	0	499	124
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	144	776	59	155	486	46	0	577	155	0	499	124
Confl. Peds. (#/hr)	102		77	77		102			145			102
Confl. Bikes (#/hr)			7			1			1			1
Heavy Vehicles (%)	2%	4%	2%	1%	1%	0%	7%	6%	6%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.0	29.0	29.0	39.0	39.0	39.0		51.0	51.0		51.0	51.0
Effective Green, g (s)	29.0	29.0	29.0	39.0	39.0	39.0		51.0	51.0		51.0	51.0
Actuated g/C Ratio	0.29	0.29	0.29	0.39	0.39	0.39		0.51	0.51		0.51	0.51
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	211	921	348	195	1232	438		711	585		790	584
v/s Ratio Prot		0.24		c0.06	0.15			c0.41			0.32	
v/s Ratio Perm	0.20		0.05	c0.25		0.04			0.13			0.11
v/c Ratio	0.68	0.84	0.17	0.79	0.39	0.11		0.81	0.26		0.63	0.21
Uniform Delay, d1	31.4	33.4	26.5	22.9	22.0	19.4		20.5	13.9		17.7	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.03	1.00		0.24	0.28
Incremental Delay, d2	16.4	9.3	1.1	27.5	0.9	0.5		8.9	1.0		1.9	0.4
Delay (s)	47.9	42.6	27.6	50.5	22.9	19.9		30.0	14.9		6.1	4.2
Level of Service	D	D	C	D	C	B		C	B		A	A
Approach Delay (s)		42.5			28.9			26.8			5.7	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1049: Ashland Ave. & W Augusta Blvd.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	170	476	52	50	247	29	0	402	118	0	494	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.90		1.00	0.91		1.00	0.96
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1523	1740	1400	1480	1647	1083		1243	1320		1255	1404
Flt Permitted	0.44	1.00	1.00	0.14	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	711	1740	1400	222	1647	1083		1243	1320		1255	1404
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	187	523	57	55	271	32	0	442	130	0	543	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	187	523	57	55	271	32	0	442	130	0	543	91
Confl. Peds. (#/hr)	34		6	6		34			20			6
Heavy Vehicles (%)	0%	0%	2%	4%	2%	14%	0%	12%	2%	2%	4%	1%
Parking (#/hr)								20			30	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.3	34.3	34.3	34.3	34.3	34.3		59.7	59.7		59.7	59.7
Effective Green, g (s)	34.3	34.3	34.3	34.3	34.3	34.3		59.7	59.7		59.7	59.7
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.60	0.60		0.60	0.60
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	243	596	480	76	564	371		742	788		749	838
v/s Ratio Prot		c0.30			0.16			0.36			c0.43	
v/s Ratio Perm	0.26		0.04	0.25		0.03			0.10			0.06
v/c Ratio	0.77	0.88	0.12	0.72	0.48	0.09		0.60	0.16		0.72	0.11
Uniform Delay, d1	29.3	30.9	22.5	28.7	25.8	22.2		12.6	9.0		14.3	8.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.80	0.70
Incremental Delay, d2	13.6	13.7	0.1	28.6	0.6	0.1		3.5	0.5		5.2	0.2
Delay (s)	43.0	44.6	22.6	57.3	26.5	22.3		16.1	9.5		16.6	6.3
Level of Service	D	D	C	E	C	C		B	A		B	A
Approach Delay (s)		42.6			30.9			14.6			15.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1056: Ashland Ave. & W Chicago Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	137	584	67	43	453	19	0	403	71	0	551	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.96		1.00	0.94
Flpb, ped/bikes	1.00	1.00		0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1588	3127		1598	3221			1389	1380		1550	1395
Flt Permitted	0.39	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	657	3127		448	3221			1389	1380		1550	1395
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	151	642	74	47	498	21	0	443	78	0	605	112
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	151	716	0	47	519	0	0	443	78	0	605	112
Confl. Peds. (#/hr)	2		103	103		2			37			61
Heavy Vehicles (%)	4%	3%	1%	0%	2%	0%	0%	4%	3%	1%	1%	0%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	23.5	23.5		23.5	23.5			33.5	33.5		33.5	33.5
Effective Green, g (s)	23.5	23.5		23.5	23.5			33.5	33.5		33.5	33.5
Actuated g/C Ratio	0.36	0.36		0.36	0.36			0.52	0.52		0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	237	1130		161	1164			715	711		798	718
v/s Ratio Prot		0.23			0.16			0.32			c0.39	
v/s Ratio Perm	c0.23			0.10					0.06			0.08
v/c Ratio	0.64	0.63		0.29	0.45			0.62	0.11		0.76	0.16
Uniform Delay, d1	17.2	17.2		14.8	15.8			11.2	8.1		12.5	8.3
Progression Factor	1.00	1.00		1.00	1.00			0.80	0.62		1.00	1.00
Incremental Delay, d2	5.5	1.2		1.0	0.3			3.1	0.2		6.7	0.5
Delay (s)	22.7	18.4		15.8	16.1			12.0	5.3		19.2	8.8
Level of Service	C	B		B	B			B	A		B	A
Approach Delay (s)		19.1			16.0			11.0			17.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1062: Ashland Ave. & W Erie St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	43	56	26	12	17	19	0	517	9	0	579	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.97			0.95			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1539			1471			1379			1427	
Flt Permitted		0.89			0.93			1.00			1.00	
Satd. Flow (perm)		1394			1382			1379			1427	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	47	62	29	13	19	21	0	568	10	0	636	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	138	0	0	53	0	0	578	0	0	644	0
Confl. Peds. (#/hr)	15		12	12		15			10			3
Heavy Vehicles (%)	2%	4%	0%	0%	0%	11%	0%	7%	0%	2%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			39.0			39.0	
Effective Green, g (s)		18.0			18.0			39.0			39.0	
Actuated g/C Ratio		0.28			0.28			0.60			0.60	
Clearance Time (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		386			382			827			856	
v/s Ratio Prot								0.42			c0.45	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.36			0.14			0.70			0.75	
Uniform Delay, d1		18.9			17.7			9.0			9.5	
Progression Factor		1.00			1.00			0.74			0.79	
Incremental Delay, d2		2.6			0.8			3.4			5.2	
Delay (s)		21.4			18.4			10.1			12.7	
Level of Service		C			B			B			B	
Approach Delay (s)		21.4			18.4			10.1			12.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	98	837	179	64	423	35	0	488	69	0	475	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.97		1.00	0.91
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1510	2876		1457	2915			1325	1337		1535	1179
Flt Permitted	0.40	1.00		0.18	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	643	2876		281	2915			1325	1337		1535	1179
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	108	920	197	70	465	38	0	536	76	0	522	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	108	1117	0	70	503	0	0	536	76	0	522	52
Confl. Peds. (#/hr)	41		61	61		41			16			58
Heavy Vehicles (%)	5%	6%	5%	8%	8%	6%	10%	9%	7%	3%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	30.6	29.6		21.8	21.8			27.4	27.4		27.4	27.4
Effective Green, g (s)	30.6	29.6		21.8	21.8			27.4	27.4		27.4	27.4
Actuated g/C Ratio	0.47	0.46		0.34	0.34			0.42	0.42		0.42	0.42
Clearance Time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	366	1309		94	977			558	563		647	496
v/s Ratio Prot	0.02	c0.39			0.17			c0.40			0.34	
v/s Ratio Perm	0.12			0.25					0.06			0.04
v/c Ratio	0.30	0.85		0.74	0.51			0.96	0.13		0.81	0.10
Uniform Delay, d1	12.9	15.8		19.1	17.4			18.3	11.5		16.5	11.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.82	0.57
Incremental Delay, d2	0.5	7.2		41.1	1.9			29.5	0.5		7.7	0.3
Delay (s)	13.3	23.0		60.3	19.3			47.8	12.0		21.2	6.8
Level of Service	B	C		E	B			D	B		C	A
Approach Delay (s)		22.1			24.3			43.3			19.9	
Approach LOS		C			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. & W Fulton St. (West)

9/16/2013

	↗	↘	↖	↑	↓	↙
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations	↰↱			↑	↱	
Volume (vph)	48	29	0	466	498	77
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.95			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.95			1.00	0.98	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1231			1450	1468	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1231			1450	1468	
Peak-hour factor, PHF	0.91	0.91	0.97	0.91	0.91	0.91
Adj. Flow (vph)	53	32	0	512	547	85
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	85	0	0	512	632	0
Confl. Peds. (#/hr)	23	12				
Heavy Vehicles (%)	29%	14%	21%	8%	5%	3%
Parking (#/hr)				0	0	
Turn Type	NA			NA	NA	
Protected Phases	4			2 10	6	
Permitted Phases						
Actuated Green, G (s)	16.0			78.0	70.0	
Effective Green, g (s)	16.0			78.0	70.0	
Actuated g/C Ratio	0.16			0.78	0.70	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	196			1131	1027	
v/s Ratio Prot	c0.07			c0.35	c0.43	
v/s Ratio Perm						
v/c Ratio	0.43			0.45	0.62	
Uniform Delay, d1	37.9			3.7	7.9	
Progression Factor	1.00			0.09	1.00	
Incremental Delay, d2	6.8			1.1	2.8	
Delay (s)	44.8			1.4	10.7	
Level of Service	D			A	B	
Approach Delay (s)	44.8			1.4	10.7	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1074: Ashland Ave. & W Fulton St. (East)

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↑
Volume (vph)	10	15	466	67	0	510
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	11	11	11	11
Total Lost time (s)	3.0		3.0			3.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.85		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		0.98			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1043		1429			1425
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	1043		1429			1425
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.99	0.91
Adj. Flow (vph)	11	16	512	74	0	560
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	27	0	586	0	0	560
Confl. Peds. (#/hr)	12	23				
Heavy Vehicles (%)	30%	20%	8%	6%	0%	5%
Parking (#/hr)			0			8
Turn Type	NA		NA			NA
Protected Phases	8		2			6 14
Permitted Phases						
Actuated Green, G (s)	16.0		70.0			78.0
Effective Green, g (s)	16.0		70.0			78.0
Actuated g/C Ratio	0.16		0.70			0.78
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	166		1000			1111
v/s Ratio Prot	c0.03		c0.41			c0.39
v/s Ratio Perm						
v/c Ratio	0.16		0.59			0.50
Uniform Delay, d1	36.2		7.6			4.0
Progression Factor	1.00		0.68			0.16
Incremental Delay, d2	2.1		1.5			1.3
Delay (s)	38.3		6.7			1.9
Level of Service	D		A			A
Approach Delay (s)	38.3		6.7			1.9
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

1077: Ashland Ave. & W Lake St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↱			↑	↱
Volume (vph)	37	280	37	6	158	42	0	490	33	0	513	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			0.99			1.00	0.69
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.99			1.00	0.85
Flt Protected		0.99			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1625			1602			1131			1689	915
Flt Permitted		0.95			0.99			1.00			1.00	1.00
Satd. Flow (perm)		1553			1584			1131			1689	915
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.93	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	41	308	41	7	174	46	0	538	36	0	564	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	390	0	0	227	0	0	574	0	0	564	16
Confl. Peds. (#/hr)	10		36	36		10			34			77
Confl. Bikes (#/hr)			3						2			6
Heavy Vehicles (%)	14%	7%	3%	67%	6%	7%	0%	9%	6%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA			NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8								6
Actuated Green, G (s)		30.0			30.0			62.0			62.0	62.0
Effective Green, g (s)		30.0			30.0			62.0			62.0	62.0
Actuated g/C Ratio		0.30			0.30			0.62			0.62	0.62
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		465			475			701			1047	567
v/s Ratio Prot								c0.51			0.33	
v/s Ratio Perm		c0.25			0.14							0.02
v/c Ratio		0.84			0.48			0.82			0.54	0.03
Uniform Delay, d1		32.7			28.6			14.7			10.8	7.3
Progression Factor		1.00			1.00			0.46			0.47	0.62
Incremental Delay, d2		16.4			3.4			9.8			1.8	0.1
Delay (s)		49.2			32.0			16.5			6.9	4.7
Level of Service		D			C			B			A	A
Approach Delay (s)		49.2			32.0			16.5			6.9	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑↑			↑↱	
Volume (vph)	0	0	0	8	139	10	0	640	0	0	558	106
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00		0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.96		1.00			0.98	
Flpb, ped/bikes				0.99	1.00	1.00		1.00			1.00	
Frt				1.00	1.00	0.85		1.00			0.98	
Flt Protected				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)				1588	3192	1242		2935			2704	
Flt Permitted				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (perm)				1588	3192	1242		2935			2704	
Peak-hour factor, PHF	0.91	0.97	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	0	0	0	9	153	11	0	703	0	0	613	116
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	9	153	11	0	703	0	0	729	0
Confl. Peds. (#/hr)			4	4		23			27			56
Confl. Bikes (#/hr)			1			2						3
Heavy Vehicles (%)	9%	0%	0%	0%	0%	10%	3%	7%	0%	0%	4%	2%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				27.0	27.0	27.0		65.0			65.0	
Effective Green, g (s)				27.0	27.0	27.0		65.0			65.0	
Actuated g/C Ratio				0.27	0.27	0.27		0.65			0.65	
Clearance Time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)				428	861	335		1907			1757	
v/s Ratio Prot					c0.05			0.24			c0.27	
v/s Ratio Perm				0.01		0.01						
v/c Ratio				0.02	0.18	0.03		0.37			0.41	
Uniform Delay, d1				26.8	28.0	26.9		8.1			8.4	
Progression Factor				1.00	1.00	1.00		0.44			0.70	
Incremental Delay, d2				0.1	0.5	0.2		0.5			0.7	
Delay (s)				26.9	28.4	27.1		4.1			6.5	
Level of Service				C	C	C		A			A	
Approach Delay (s)		0.0			28.3			4.1			6.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1080: Ashland Ave. & W Warren Blvd.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↑↱			↑↑	
Volume (vph)	108	278	42	0	0	0	0	530	65	0	464	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						0.95			0.95	
Frpb, ped/bikes		1.00						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.98			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		2873						2591			2589	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		2873						2591			2589	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	119	305	46	0	0	0	0	582	71	0	510	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	470	0	0	0	0	0	653	0	0	510	0
Confl. Peds. (#/hr)	3		5			3			29			32
Confl. Bikes (#/hr)			4						2			2
Heavy Vehicles (%)	7%	3%	2%	0%	0%	0%	0%	7%	3%	3%	4%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		37.0						55.0			55.0	
Effective Green, g (s)		37.0						55.0			55.0	
Actuated g/C Ratio		0.37						0.55			0.55	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1063						1425			1423	
v/s Ratio Prot								c0.25			0.20	
v/s Ratio Perm		0.16										
v/c Ratio		0.44						0.46			0.36	
Uniform Delay, d1		23.7						13.5			12.6	
Progression Factor		1.00						0.71			0.51	
Incremental Delay, d2		1.3						1.0			0.7	
Delay (s)		25.1						10.6			7.1	
Level of Service		C						B			A	
Approach Delay (s)		25.1			0.0			10.6			7.1	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

1082: Ashland Ave. & W Madison St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	48	324	39	20	218	73	0	407	3	0	556	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.96			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1513	2864		1569	2800			2906			3023	
Flt Permitted	0.53	1.00		0.46	1.00			1.00			1.00	
Satd. Flow (perm)	838	2864		762	2800			2906			3023	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	53	356	43	22	240	80	0	447	3	0	611	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	53	399	0	22	320	0	0	450	0	0	635	0
Confl. Peds. (#/hr)	16		23	23		16			17			25
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	4%	9%	10%	0%	10%	5%	17%	8%	0%	5%	3%	5%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8								
Actuated Green, G (s)	33.0	33.0		45.0	43.0			49.0			49.0	
Effective Green, g (s)	33.0	33.0		45.0	43.0			49.0			49.0	
Actuated g/C Ratio	0.33	0.33		0.45	0.43			0.49			0.49	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	276	945		342	1204			1423			1481	
v/s Ratio Prot		c0.14			c0.11			0.15			c0.21	
v/s Ratio Perm	0.06			0.03								
v/c Ratio	0.19	0.42		0.06	0.27			0.32			0.43	
Uniform Delay, d1	24.0	26.1		15.6	18.3			15.4			16.5	
Progression Factor	1.00	1.00		1.00	1.00			0.50			0.43	
Incremental Delay, d2	1.5	1.4		0.4	0.5			0.4			0.9	
Delay (s)	25.5	27.5		15.9	18.9			8.1			8.0	
Level of Service	C	C		B	B			A			A	
Approach Delay (s)		27.2			18.7			8.1			8.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1083: Ashland Ave. & W Ogden Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	160	558	0	250	568	1	0	320	185	0	405	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1628	3288		1588	3143			2835			2897	
Flt Permitted	0.38	1.00		0.36	1.00			1.00			1.00	
Satd. Flow (perm)	646	3288		598	3143			2835			2897	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	176	613	0	275	624	1	0	352	203	0	445	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	176	613	0	275	625	0	0	555	0	0	570	0
Confl. Peds. (#/hr)	1		5	5		1			15			20
Confl. Bikes (#/hr)			3									2
Heavy Vehicles (%)	5%	4%	0%	4%	5%	100%	0%	9%	9%	0%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	3	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	47.0	47.0		64.0	63.0			29.0			29.0	
Effective Green, g (s)	47.0	47.0		64.0	63.0			29.0			29.0	
Actuated g/C Ratio	0.47	0.47		0.64	0.63			0.29			0.29	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	303	1545		511	1980			822			840	
v/s Ratio Prot		0.19		c0.07	0.20			0.20			c0.20	
v/s Ratio Perm	c0.27			0.27								
v/c Ratio	0.58	0.40		0.54	0.32			0.68			0.68	
Uniform Delay, d1	19.3	17.3		15.6	8.5			31.3			31.4	
Progression Factor	1.00	1.00		1.00	1.00			0.91			0.97	
Incremental Delay, d2	7.9	0.8		4.0	0.4			4.1			4.1	
Delay (s)	27.2	18.0		19.6	9.0			32.6			34.6	
Level of Service	C	B		B	A			C			C	
Approach Delay (s)		20.1			12.2			32.6			34.6	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1084: Ashland Ave. & W Monroe St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations		✢			✢			↑↱			↑↱	
Volume (vph)	0	72	31	46	20	21	0	636	50	0	497	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.97			0.99			1.00	
Flt Protected		1.00			0.97			1.00			1.00	
Satd. Flow (prot)		1561			1439			2672			3019	
Flt Permitted		1.00			0.82			1.00			1.00	
Satd. Flow (perm)		1561			1210			2672			3019	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	79	34	51	22	23	0	699	55	0	546	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	113	0	0	96	0	0	754	0	0	547	0
Confl. Peds. (#/hr)	5		15	15		5			39			16
Confl. Bikes (#/hr)			2			1			1			
Heavy Vehicles (%)	0%	3%	0%	9%	10%	5%	0%	8%	2%	1%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.0			28.0			64.0			64.0	
Effective Green, g (s)		28.0			28.0			64.0			64.0	
Actuated g/C Ratio		0.28			0.28			0.64			0.64	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		437			338			1710			1932	
v/s Ratio Prot		0.07						c0.28			0.18	
v/s Ratio Perm					c0.08							
v/c Ratio		0.26			0.28			0.44			0.28	
Uniform Delay, d1		27.9			28.2			9.0			7.9	
Progression Factor		1.00			1.00			0.38			0.47	
Incremental Delay, d2		1.4			2.1			0.7			0.3	
Delay (s)		29.4			30.3			4.2			4.0	
Level of Service		C			C			A			A	
Approach Delay (s)		29.4			30.3			4.2			4.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1085: Ashland Ave. & W Adams St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑↱			↑↱	
Volume (vph)	0	0	0	202	140	145	0	538	0	0	493	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.96			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					2717			2495			2858	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					2717			2495			2858	
Peak-hour factor, PHF	0.91	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	222	154	159	0	591	0	0	542	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	535	0	0	591	0	0	578	0
Confl. Peds. (#/hr)			53	53		32			25			45
Confl. Bikes (#/hr)			1			1			2			3
Heavy Vehicles (%)	6%	0%	0%	5%	6%	3%	0%	8%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								54			12	12
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					42.0			50.0			50.0	
Effective Green, g (s)					42.0			50.0			50.0	
Actuated g/C Ratio					0.42			0.50			0.50	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					1141			1247			1429	
v/s Ratio Prot								c0.24			0.20	
v/s Ratio Perm					0.20							
v/c Ratio					0.47			0.47			0.40	
Uniform Delay, d1					20.9			16.4			15.7	
Progression Factor					1.00			0.12			0.50	
Incremental Delay, d2					1.4			1.2			0.8	
Delay (s)					22.3			3.1			8.6	
Level of Service					C			A			A	
Approach Delay (s)		0.0			22.3			3.1			8.6	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱			↑↑	
Volume (vph)	34	166	88	0	0	0	0	498	52	0	496	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0			4.0	
Lane Util. Factor		0.95	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.97					1.00			1.00	
Flpb, ped/bikes		1.00	1.00					1.00			1.00	
Frt		1.00	0.85					0.99			1.00	
Flt Protected		0.99	1.00					1.00			1.00	
Satd. Flow (prot)		3217	1455					2966			2781	
Flt Permitted		0.99	1.00					1.00			1.00	
Satd. Flow (perm)		3217	1455					2966			2781	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.88	0.91	0.92	0.91	0.91	0.88	0.91	0.91
Adj. Flow (vph)	37	182	97	0	0	0	0	547	57	0	545	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	219	97	0	0	0	0	604	0	0	545	0
Confl. Peds. (#/hr)	12		16			12			9			17
Heavy Vehicles (%)	6%	5%	2%	2%	0%	0%	2%	10%	6%	4%	7%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4		4									
Actuated Green, G (s)		36.0	36.0					55.0			55.0	
Effective Green, g (s)		36.0	36.0					55.0			55.0	
Actuated g/C Ratio		0.36	0.36					0.55			0.55	
Clearance Time (s)		5.0	5.0					4.0			4.0	
Lane Grp Cap (vph)		1158	523					1631			1529	
v/s Ratio Prot								c0.20			0.20	
v/s Ratio Perm		0.07	0.07									
v/c Ratio		0.19	0.19					0.37			0.36	
Uniform Delay, d1		22.0	21.9					12.7			12.6	
Progression Factor		1.00	1.00					0.35			0.78	
Incremental Delay, d2		0.4	0.8					0.5			0.6	
Delay (s)		22.3	22.7					4.9			10.4	
Level of Service		C	C					A			B	
Approach Delay (s)		22.5			0.0			4.9			10.4	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1088: Ashland Ave. & W Van Buren St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↑	↱	↰	↰↑			↑↱	
Volume (vph)	0	0	0	748	288	193	405	502	0	0	645	125
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				0.97	1.00	1.00	0.91	0.91			0.95	
Frpb, ped/bikes				1.00	1.00	0.96	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	1.00	1.00	0.95	0.99			1.00	
Satd. Flow (prot)				3175	1657	1353	1446	2735			2891	
Flt Permitted				0.95	1.00	1.00	0.95	0.66			1.00	
Satd. Flow (perm)				3175	1657	1353	1446	1834			2891	
Peak-hour factor, PHF	0.91	0.99	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	0	0	0	822	316	212	445	552	0	0	709	137
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	822	316	212	325	672	0	0	846	0
Confl. Peds. (#/hr)			2	2		19	13		9			13
Confl. Bikes (#/hr)						1			2			2
Heavy Vehicles (%)	7%	0%	0%	1%	5%	5%	4%	10%	0%	0%	5%	6%
Parking (#/hr)								0			0	
Turn Type				Split	NA	Perm	Prot	NA			NA	
Protected Phases				8	8		5	5 6			6 16	
Permitted Phases						8						
Actuated Green, G (s)				25.0	25.0	25.0	34.0	49.0			29.0	
Effective Green, g (s)				25.0	25.0	25.0	34.0	49.0			27.0	
Actuated g/C Ratio				0.25	0.25	0.25	0.34	0.49			0.27	
Clearance Time (s)				4.0	4.0	4.0	4.0					
Lane Grp Cap (vph)				793	414	338	491	1205			780	
v/s Ratio Prot				c0.26	0.19		c0.22	0.19			c0.29	
v/s Ratio Perm						0.16		0.08				
v/c Ratio				1.04	0.76	0.63	0.66	0.56			1.08	
Uniform Delay, d1				37.5	34.8	33.4	28.1	17.9			36.5	
Progression Factor				1.00	1.00	1.00	0.45	0.44			0.79	
Incremental Delay, d2				41.8	12.5	8.5	2.9	0.8			57.3	
Delay (s)				79.3	47.3	41.9	15.5	8.7			86.2	
Level of Service				E	D	D	B	A			F	
Approach Delay (s)		0.0			65.9			10.9			86.2	
Approach LOS		A			E			B			F	

Intersection Summary			
HCM 2000 Control Delay	54.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱		↰	↑↑	
Volume (vph)	150	172	221	0	0	0	0	808	253	259	880	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0					2.0		4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.96		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3155	1471					2810		1589	3031	
Flt Permitted		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		3155	1471					2810		1589	3031	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	165	189	243	0	0	0	0	888	278	285	967	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	354	243	0	0	0	0	1166	0	285	967	0
Confl. Peds. (#/hr)			6						3	3		2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	7%	5%	2%	1%	0%	0%	0%	8%	2%	4%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2 12		1	1 2	
Permitted Phases			4									
Actuated Green, G (s)		26.0	26.0					42.0		22.0	42.0	
Effective Green, g (s)		26.0	26.0					42.0		22.0	42.0	
Actuated g/C Ratio		0.26	0.26					0.42		0.22	0.42	
Clearance Time (s)		4.0	4.0							4.0		
Lane Grp Cap (vph)		820	382					1180		349	1273	
v/s Ratio Prot		0.11						c0.41		c0.18	0.32	
v/s Ratio Perm			c0.17									
v/c Ratio		0.43	0.64					0.99		0.82	0.76	
Uniform Delay, d1		30.8	32.8					28.8		37.1	24.7	
Progression Factor		1.00	1.00					0.89		1.07	0.91	
Incremental Delay, d2		1.7	7.9					20.6		2.0	0.4	
Delay (s)		32.5	40.7					46.1		41.8	23.0	
Level of Service		C	D					D		D	C	
Approach Delay (s)		35.8			0.0			46.1			27.3	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	174	124	52	100	202	81	0	959	37	0	904	247
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.98			1.00			0.99	
Flpb, ped/bikes	0.99	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.96			0.99			0.97	
Flt Protected	0.95	0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1493	2925		1512	2865			2868			2901	
Flt Permitted	0.43	0.75		0.58	1.00			1.00			1.00	
Satd. Flow (perm)	679	2221		927	2865			2868			2901	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	191	136	57	110	222	89	0	1054	41	0	993	271
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	120	264	0	110	311	0	0	1095	0	0	1264	0
Confl. Peds. (#/hr)	31		71	71		31			41			22
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	2%	0%	0%	7%	0%	0%	8%	8%	3%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA			NA			NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.0	33.0		22.0	22.0			57.0			57.0	
Effective Green, g (s)	33.0	33.0		22.0	22.0			57.0			57.0	
Actuated g/C Ratio	0.33	0.33		0.22	0.22			0.57			0.57	
Clearance Time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	289	789		203	630			1634			1653	
v/s Ratio Prot	c0.03	0.03			0.11			0.38			c0.44	
v/s Ratio Perm	0.10	0.08		c0.12								
v/c Ratio	0.42	0.33		0.54	0.49			0.67			0.76	
Uniform Delay, d1	24.6	25.2		34.5	34.1			15.0			16.4	
Progression Factor	1.00	1.00		1.00	1.00			0.55			0.83	
Incremental Delay, d2	4.4	1.1		10.0	2.8			1.9			2.3	
Delay (s)	29.0	26.4		44.5	36.9			10.2			15.9	
Level of Service	C	C		D	D			B			B	
Approach Delay (s)		27.2			38.9			10.2			15.9	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1091: Ashland Ave. & W Flourney St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✥			↑↱			↑↱	
Volume (vph)	108	0	14	2	0	11	0	956	3	0	637	299
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.99		0.98			1.00			0.98	
Flpb, ped/bikes	0.98		1.00		1.00			1.00			1.00	
Frt	1.00		0.85		0.88			1.00			0.95	
Flt Protected	0.95		1.00		0.99			1.00			1.00	
Satd. Flow (prot)	3044		1409		1550			2934			2874	
Flt Permitted	0.75		1.00		0.99			1.00			1.00	
Satd. Flow (perm)	2398		1409		1550			2934			2874	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	119	0	15	2	0	12	0	1051	3	0	700	329
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	119	0	15	0	14	0	0	1054	0	0	1029	0
Confl. Peds. (#/hr)	9		1	1		9			21			14
Confl. Bikes (#/hr)									4			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	28.0		28.0		28.0			63.0			63.0	
Effective Green, g (s)	28.0		28.0		28.0			63.0			63.0	
Actuated g/C Ratio	0.28		0.28		0.28			0.63			0.63	
Clearance Time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Grp Cap (vph)	671		394		434			1848			1810	
v/s Ratio Prot								c0.36			0.36	
v/s Ratio Perm	c0.05		0.01		0.01							
v/c Ratio	0.18		0.04		0.03			0.57			0.57	
Uniform Delay, d1	27.3		26.2		26.2			10.7			10.7	
Progression Factor	1.00		1.00		1.00			1.12			0.28	
Incremental Delay, d2	0.6		0.2		0.1			1.1			0.9	
Delay (s)	27.9		26.4		26.3			13.1			3.8	
Level of Service	C		C		C			B			A	
Approach Delay (s)		27.7			26.3			13.1			3.8	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1092: Ashland Ave. & W Polk St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑↱			↑↱	
Volume (vph)	86	16	37	6	28	70	0	902	10	0	563	147
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.95			0.93			1.00			0.98	
Flpb, ped/bikes		0.96			0.99			1.00			1.00	
Frt		0.96			0.91			1.00			0.97	
Flt Protected		0.97			1.00			1.00			1.00	
Satd. Flow (prot)		1429			1411			2876			2821	
Flt Permitted		0.78			0.99			1.00			1.00	
Satd. Flow (perm)		1149			1395			2876			2821	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	95	18	41	7	31	77	0	991	11	0	619	162
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	154	0	0	115	0	0	1002	0	0	781	0
Confl. Peds. (#/hr)	60		129	129		60			39			14
Confl. Bikes (#/hr)			4			6			5			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	8%	20%	0%	6%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		30.0			30.0			62.0			62.0	
Effective Green, g (s)		30.0			30.0			62.0			62.0	
Actuated g/C Ratio		0.30			0.30			0.62			0.62	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		344			418			1783			1749	
v/s Ratio Prot								c0.35			0.28	
v/s Ratio Perm		c0.13			0.08							
v/c Ratio		0.45			0.28			0.56			0.45	
Uniform Delay, d1		28.3			26.7			11.1			10.0	
Progression Factor		1.00			1.00			1.11			0.26	
Incremental Delay, d2		4.2			1.6			1.2			0.7	
Delay (s)		32.5			28.3			13.5			3.3	
Level of Service		C			C			B			A	
Approach Delay (s)		32.5			28.3			13.5			3.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1093: Ashland Ave. & W Taylor St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	36	123	37	44	254	68	0	656	95	0	312	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.85		0.98			0.97	
Flpb, ped/bikes	0.92	1.00	1.00	0.98	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.98			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1472	1570	1369	1559	1600	1188		2747			2675	
Flt Permitted	0.46	1.00	1.00	0.65	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	716	1570	1369	1064	1600	1188		2747			2675	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	40	135	41	48	279	75	0	721	104	0	343	211
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	40	135	41	48	279	75	0	825	0	0	554	0
Confl. Peds. (#/hr)	98		20	20		98			23			15
Confl. Bikes (#/hr)			2			5			1			3
Heavy Vehicles (%)	0%	7%	0%	0%	5%	2%	0%	10%	8%	6%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	36.0	36.0	36.0	36.0	36.0	36.0		55.0			55.0	
Effective Green, g (s)	36.0	36.0	36.0	36.0	36.0	36.0		55.0			55.0	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36		0.55			0.55	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Grp Cap (vph)	257	565	492	383	576	427		1510			1471	
v/s Ratio Prot		0.09			c0.17			c0.30			0.21	
v/s Ratio Perm	0.06		0.03	0.05		0.06						
v/c Ratio	0.16	0.24	0.08	0.13	0.48	0.18		0.55			0.38	
Uniform Delay, d1	21.7	22.4	21.1	21.4	24.8	21.9		14.5			12.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.72			0.29	
Incremental Delay, d2	1.3	1.0	0.3	0.7	2.9	0.9		0.6			0.7	
Delay (s)	23.0	23.4	21.4	22.1	27.7	22.8		11.1			4.4	
Level of Service	C	C	C	C	C	C		B			A	
Approach Delay (s)		23.0			26.1			11.1			4.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	131	862	108	126	1016	259	0	619	115	0	334	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96		1.00	0.93		1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1564	4305		1504	3099	1337		1491	1214		1657	1249
Flt Permitted	0.11	1.00		0.16	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	188	4305		255	3099	1337		1491	1214		1657	1249
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	144	947	119	138	1116	285	0	680	126	0	367	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	144	1066	0	138	1116	285	0	680	126	0	367	91
Confl. Peds. (#/hr)	28		24	24		28			52			29
Confl. Bikes (#/hr)						4			3			1
Heavy Vehicles (%)	2%	4%	4%	6%	3%	2%	5%	5%	1%	3%	5%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	42.0	35.0		42.0	35.0	35.0		45.0	45.0		45.0	45.0
Effective Green, g (s)	42.0	35.0		42.0	35.0	35.0		45.0	45.0		45.0	45.0
Actuated g/C Ratio	0.42	0.35		0.42	0.35	0.35		0.45	0.45		0.45	0.45
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	5.0	3.0		5.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	175	1506		194	1084	467		670	546		745	562
v/s Ratio Prot	c0.06	0.25		0.05	c0.36			c0.46			0.22	
v/s Ratio Perm	0.29			0.25		0.21			0.10			0.07
v/c Ratio	0.82	0.71		0.71	1.03	0.61		1.01	0.23		0.49	0.16
Uniform Delay, d1	22.8	28.1		19.8	32.5	26.9		27.5	16.9		19.4	16.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.72	0.58		0.88	0.96
Incremental Delay, d2	28.3	2.8		14.2	35.2	5.8		34.7	0.8		2.2	0.6
Delay (s)	51.2	30.9		34.0	67.7	32.7		54.6	10.6		19.4	16.3
Level of Service	D	C		C	E	C		D	B		B	B
Approach Delay (s)		33.3			58.2			47.7			18.8	
Approach LOS		C			E			D			B	

Intersection Summary			
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1096: Ashland Ave. & W 13th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	50	0	35	2	0	1	0	703	2	0	342	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.94			0.95			1.00			0.99	
Flt Protected		0.97			0.97			1.00			1.00	
Satd. Flow (prot)		1507			1624			1448			1464	
Flt Permitted		0.82			0.88			1.00			1.00	
Satd. Flow (perm)		1267			1470			1448			1464	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	55	0	38	2	0	1	0	773	2	0	376	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	0	0	3	0	0	775	0	0	401	0
Confl. Peds. (#/hr)	2		7	7		2			8			10
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	6%	0%	8%	0%	6%	0%	4%	8%	50%	0%	6%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		11.3			11.3			80.7			80.7	
Effective Green, g (s)		11.3			11.3			80.7			80.7	
Actuated g/C Ratio		0.11			0.11			0.81			0.81	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		143			166			1168			1181	
v/s Ratio Prot								c0.54			0.27	
v/s Ratio Perm		c0.07			0.00							
v/c Ratio		0.65			0.02			0.66			0.34	
Uniform Delay, d1		42.5			39.4			4.0			2.6	
Progression Factor		1.00			1.00			0.00			0.66	
Incremental Delay, d2		13.4			0.1			1.3			0.7	
Delay (s)		55.8			39.5			1.3			2.3	
Level of Service		E			D			A			A	
Approach Delay (s)		55.8			39.5			1.3			2.3	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1098: Ashland Ave. & W 14th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	0	0	20	11	0	3	0	758	0	0	298	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.90			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.94			1.00			1.00	
Frt		0.86			0.97			1.00			1.00	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1406			1586			1297			1446	
Flt Permitted		1.00			0.86			1.00			1.00	
Satd. Flow (perm)		1406			1426			1297			1446	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	0	0	22	12	0	3	0	833	0	0	327	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	22	0	0	15	0	0	833	0	0	334	0
Confl. Peds. (#/hr)			30	30					6			9
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	7%	0%	0%	0%	0%	0%	2%	10%	0%	4%	8%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			72.0			72.0	
Effective Green, g (s)		20.0			20.0			72.0			72.0	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		281			285			933			1041	
v/s Ratio Prot		c0.02						c0.64			0.23	
v/s Ratio Perm					0.01							
v/c Ratio		0.08			0.05			0.89			0.32	
Uniform Delay, d1		32.5			32.3			11.0			5.1	
Progression Factor		1.00			1.00			1.00			0.80	
Incremental Delay, d2		0.5			0.4			12.7			0.8	
Delay (s)		33.1			32.7			23.7			4.9	
Level of Service		C			C			C			A	
Approach Delay (s)		33.1			32.7			23.7			4.9	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1103: Ashland Ave. & W 18th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	67	257	93	68	358	148	0	759	88	0	294	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.74		1.00	0.84		1.00	0.86
Flpb, ped/bikes	0.91	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1393	1600	1245	1501	1585	1039		1289	1115		1254	1065
Flt Permitted	0.19	1.00	1.00	0.37	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	280	1600	1245	586	1585	1039		1289	1115		1254	1065
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	74	282	102	75	393	163	0	834	97	0	323	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	74	282	102	75	393	163	0	834	97	0	323	63
Confl. Peds. (#/hr)	117		28	28		117			43			39
Confl. Bikes (#/hr)			6			3						1
Heavy Vehicles (%)	4%	5%	5%	3%	6%	2%	1%	8%	12%	6%	11%	19%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	23.0	23.0	23.0	23.0	23.0	23.0		56.0	56.0		56.0	56.0
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0		56.0	56.0		56.0	56.0
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26		0.62	0.62		0.62	0.62
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	71	408	318	149	405	265		802	693		780	662
v/s Ratio Prot		0.18			0.25			c0.65			0.26	
v/s Ratio Perm	c0.26		0.08	0.13		0.16			0.09			0.06
v/c Ratio	1.04	0.69	0.32	0.50	0.97	0.62		1.04	0.14		0.41	0.10
Uniform Delay, d1	33.5	30.3	27.2	28.6	33.2	29.6		17.0	7.0		8.7	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.59	0.54		1.00	1.00
Incremental Delay, d2	119.0	9.3	2.6	11.6	37.9	10.2		30.7	0.2		1.6	0.3
Delay (s)	152.5	39.5	29.8	40.3	71.1	39.8		40.7	3.9		10.3	7.1
Level of Service	F	D	C	D	E	D		D	A		B	A
Approach Delay (s)		55.6			59.3			36.9			9.8	
Approach LOS		E			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1105: Ashland Ave. & W 19th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	58	44	18	43	77	75	0	824	7	0	519	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.93			1.00			0.99	
Flpb, ped/bikes		0.95			0.97			1.00			1.00	
Frt		0.98			0.95			1.00			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1556			1487			1333			1234	
Flt Permitted		0.68			0.92			1.00			1.00	
Satd. Flow (perm)		1085			1380			1333			1234	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	64	48	20	47	85	82	0	905	8	0	570	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	132	0	0	214	0	0	913	0	0	610	0
Confl. Peds. (#/hr)	73		75	75		73			59			40
Confl. Bikes (#/hr)			1			1			1			2
Heavy Vehicles (%)	5%	0%	0%	0%	0%	6%	6%	8%	0%	0%	8%	3%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		19.0			19.0			63.0			63.0	
Effective Green, g (s)		19.0			19.0			63.0			63.0	
Actuated g/C Ratio		0.21			0.21			0.70			0.70	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		229			291			933			863	
v/s Ratio Prot								c0.68			0.49	
v/s Ratio Perm		0.12			c0.16							
v/c Ratio		0.58			0.74			0.98			0.71	
Uniform Delay, d1		31.9			33.2			12.9			8.0	
Progression Factor		1.00			1.00			0.70			0.63	
Incremental Delay, d2		10.2			15.2			18.9			4.7	
Delay (s)		42.0			48.4			28.0			9.8	
Level of Service		D			D			C			A	
Approach Delay (s)		42.0			48.4			28.0			9.8	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	45	176	9	97	132	33	0	669	32	0	535	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		0.99			0.97			1.00			1.00	
Frt		0.99			0.98			0.99			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1702			1582			1287			1317	
Flt Permitted		0.88			0.69			1.00			1.00	
Satd. Flow (perm)		1503			1106			1287			1317	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	49	193	10	107	145	36	0	735	35	0	588	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	252	0	0	288	0	0	770	0	0	612	0
Confl. Peds. (#/hr)	49		88	88		49			32			43
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	9%	1%	0%	4%	3%	13%	0%	7%	3%	2%	10%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			58.0			58.0	
Effective Green, g (s)		24.0			24.0			58.0			58.0	
Actuated g/C Ratio		0.27			0.27			0.64			0.64	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		400			294			829			848	
v/s Ratio Prot								c0.60			0.46	
v/s Ratio Perm		0.17			c0.26							
v/c Ratio		0.63			0.98			0.93			0.72	
Uniform Delay, d1		29.1			32.8			14.2			10.6	
Progression Factor		1.00			1.00			0.63			0.49	
Incremental Delay, d2		4.4			46.8			9.5			4.0	
Delay (s)		33.5			79.5			18.5			9.2	
Level of Service		C			E			B			A	
Approach Delay (s)		33.5			79.5			18.5			9.2	
Approach LOS		C			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

1109: S Blue Island Ave. & Ashland Ave. & W Cermak Rd.

9/16/2013

	↗	→	↘	↙	↙	←	↖	↑	↗	↓	↙	↙
Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↰	↑↱			↰	↑↱		↑↱		↑	↱	
Volume (vph)	75	349	52	92	92	495	173	604	98	486	130	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	11	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95			1.00	0.95		0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00	0.92		1.00		1.00	0.89	
Flpb, ped/bikes	0.90	1.00			1.00	1.00		1.00		1.00	1.00	
Frt	1.00	0.98			1.00	0.96		0.98		1.00	0.85	
Flt Protected	0.95	1.00			0.95	1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1293	3016			1347	2678		2313		1402	962	
Flt Permitted	0.31	1.00			0.30	1.00		1.00		1.00	1.00	
Satd. Flow (perm)	420	3016			425	2678		2313		1402	962	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	384	57	101	101	544	190	664	108	534	143	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	82	441	0	0	202	734	0	772	0	534	172	0
Confl. Peds. (#/hr)	155						155				50	
Confl. Bikes (#/hr)							5		1		3	
Heavy Vehicles (%)	11%	8%	4%	15%	22%	8%	11%	7%	6%	8%	18%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	3	0
Parking (#/hr)								74	74	6	6	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		NA		NA	Perm	
Protected Phases		4		3	3	8		2		6		
Permitted Phases	4			8	8						6	
Actuated Green, G (s)	20.5	20.5			29.5	29.5		32.0		32.0	32.0	
Effective Green, g (s)	20.5	20.5			29.5	29.5		32.0		32.0	32.0	
Actuated g/C Ratio	0.23	0.23			0.33	0.33		0.36		0.36	0.36	
Clearance Time (s)	4.0	4.0			3.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	95	686			200	877		822		498	342	
v/s Ratio Prot		0.15			c0.07	0.27		0.33		c0.38		
v/s Ratio Perm	0.20				c0.26						0.18	
v/c Ratio	0.86	0.64			1.01	0.84		0.94		1.07	0.50	
Uniform Delay, d1	33.4	31.4			29.2	28.0		28.1		29.0	22.8	
Progression Factor	1.00	1.00			1.00	1.00		0.96		0.86	0.93	
Incremental Delay, d2	50.8	2.1			66.2	7.0		17.5		54.9	0.8	
Delay (s)	84.2	33.5			95.4	35.0		44.4		79.7	21.9	
Level of Service	F	C			F	D		D		E	C	
Approach Delay (s)		41.5				48.1		44.4		65.6		
Approach LOS		D				D		D		E		

Intersection Summary			
HCM 2000 Control Delay	50.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. & Ashland Ave. & W Cermak Rd.

9/16/2013

	↗	↗	↷
Movement	NEL	NER	NER2
Lane Configurations	↗	↗↗	
Volume (vph)	208	204	37
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	11	12	12
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.88	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.85	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1401	2338	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1401	2338	
Peak-hour factor, PHF	0.91	0.91	0.91
Adj. Flow (vph)	229	224	41
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	229	265	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Heavy Vehicles (%)	18%	15%	16%
Bus Blockages (#/hr)	0	0	0
Parking (#/hr)			
Turn Type	NA	Perm	
Protected Phases	9		
Permitted Phases		9	
Actuated Green, G (s)	16.5	16.5	
Effective Green, g (s)	16.5	16.5	
Actuated g/C Ratio	0.18	0.18	
Clearance Time (s)	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	256	428	
v/s Ratio Prot	c0.16		
v/s Ratio Perm		0.11	
v/c Ratio	0.89	0.62	
Uniform Delay, d1	35.9	33.9	
Progression Factor	1.00	1.00	
Incremental Delay, d2	30.1	2.7	
Delay (s)	66.0	36.5	
Level of Service	E	D	
Approach Delay (s)	50.2		
Approach LOS	D		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1110: Ashland Ave. & 2451 S Ashland Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	2	0	3	2	0	0	0	757	0	0	563	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			1.00			1.00			1.00	
Flpb, ped/bikes		0.99			0.94			1.00			1.00	
Frt		0.92			1.00			1.00			1.00	
Flt Protected		0.98			0.95			1.00			1.00	
Satd. Flow (prot)		1538			807			1596			1672	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1569			850			1596			1672	
Peak-hour factor, PHF	0.91	0.94	0.91	0.91	0.94	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	2	0	3	2	0	0	0	832	0	0	619	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	0	2	0	0	832	0	0	621	0
Confl. Peds. (#/hr)	1		2	2		1			2			1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	100%	0%	0%	14%	9%	0%	25%	4%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		1.6			1.6			78.4			78.4	
Effective Green, g (s)		1.6			1.6			78.4			78.4	
Actuated g/C Ratio		0.02			0.02			0.87			0.87	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		27			15			1390			1456	
v/s Ratio Prot								c0.52			0.37	
v/s Ratio Perm		c0.00			0.00							
v/c Ratio		0.19			0.13			0.60			0.43	
Uniform Delay, d1		43.6			43.5			1.6			1.2	
Progression Factor		1.00			1.00			1.00			1.10	
Incremental Delay, d2		6.8			8.3			1.9			0.2	
Delay (s)		50.4			51.8			3.5			1.5	
Level of Service		D			D			A			A	
Approach Delay (s)		50.4			51.8			3.5			1.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↰	↱	↰	↑	↓	↱
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑	↱
Volume (vph)	0	1	0	775	645	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)		4.0		5.0	5.0	
Lane Util. Factor		1.00		1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		765		1642	1582	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		765		1642	1582	
Peak-hour factor, PHF	0.91	0.91	0.96	0.91	0.91	0.91
Adj. Flow (vph)	0	1	0	852	709	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	852	709	0
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	100%	50%	6%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	3
Turn Type		Perm		NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4				6
Actuated Green, G (s)		1.3		89.7	89.7	
Effective Green, g (s)		1.3		89.7	89.7	
Actuated g/C Ratio		0.01		0.90	0.90	
Clearance Time (s)		4.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0	
Lane Grp Cap (vph)		9		1472	1419	
v/s Ratio Prot				c0.52	0.45	
v/s Ratio Perm		c0.00				
v/c Ratio		0.11		0.58	0.50	
Uniform Delay, d1		48.8		1.1	1.0	
Progression Factor		1.00		0.56	1.00	
Incremental Delay, d2		5.4		1.0	1.3	
Delay (s)		54.2		1.6	2.2	
Level of Service		D		A	A	
Approach Delay (s)	54.2			1.6	2.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	1.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1112: Ashland Ave. & W Marketplace Access Rd.

9/16/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↳	
Volume (vph)	32	17	0	745	574	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1096	1012		1171	1138	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1096	1012		1171	1138	
Peak-hour factor, PHF	0.91	0.91	0.92	0.91	0.91	0.91
Adj. Flow (vph)	35	19	0	819	631	20
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	35	19	0	819	651	0
Confl. Peds. (#/hr)		1				3
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	56%	47%	29%	4%	7%	39%
Parking (#/hr)				40	38	
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	6.3	6.3		84.7	84.7	
Effective Green, g (s)	6.3	6.3		84.7	84.7	
Actuated g/C Ratio	0.06	0.06		0.85	0.85	
Clearance Time (s)	4.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	69	63		991	963	
v/s Ratio Prot	c0.03			c0.70	0.57	
v/s Ratio Perm		0.02				
v/c Ratio	0.51	0.30		0.83	0.68	
Uniform Delay, d1	45.3	44.7		3.9	2.7	
Progression Factor	1.00	1.00		0.99	0.83	
Incremental Delay, d2	5.8	2.7		4.6	3.4	
Delay (s)	51.1	47.4		8.4	5.7	
Level of Service	D	D		A	A	
Approach Delay (s)	49.8			8.4	5.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1113: Ashland Ave. & W 31st Pl.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		✥			↱		↰	↑	↱
Volume (vph)	388	0	187	26	0	16	0	471	16	0	467	182
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0			12.0			12.0	12.0
Lane Util. Factor	1.00		1.00		1.00			1.00			1.00	1.00
Frpb, ped/bikes	1.00		1.00		1.00			1.00			1.00	0.98
Flpb, ped/bikes	1.00		1.00		1.00			1.00			1.00	1.00
Frt	1.00		0.85		0.95			1.00			1.00	0.85
Flt Protected	0.95		1.00		0.97			1.00			1.00	1.00
Satd. Flow (prot)	1605		1222		1159			1631			1611	1352
Flt Permitted	0.95		1.00		0.97			1.00			1.00	1.00
Satd. Flow (perm)	1605		1222		1159			1631			1611	1352
Peak-hour factor, PHF	0.91	0.96	0.91	0.91	0.96	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	426	0	205	29	0	18	0	518	18	0	513	200
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	426	0	205	0	47	0	0	536	0	0	513	200
Confl. Peds. (#/hr)									47			1
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	0%	21%	31%	0%	62%	0%	5%	31%	82%	8%	7%
Turn Type	Split		Perm	Split	NA			NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases			4							6		6
Actuated Green, G (s)	28.0		28.0		6.3			45.7			45.7	45.7
Effective Green, g (s)	28.0		28.0		6.3			45.7			45.7	45.7
Actuated g/C Ratio	0.28		0.28		0.06			0.46			0.46	0.46
Clearance Time (s)	4.0		4.0		4.0			12.0			12.0	12.0
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	449		342		73			745			736	617
v/s Ratio Prot	c0.27				c0.04			c0.33			0.32	
v/s Ratio Perm			0.17									0.15
v/c Ratio	0.95		0.60		0.64			0.72			0.70	0.32
Uniform Delay, d1	35.3		31.1		45.8			22.0			21.6	17.3
Progression Factor	1.00		1.00		1.00			1.09			0.89	0.87
Incremental Delay, d2	31.4		7.6		17.8			3.8			4.5	1.1
Delay (s)	66.7		38.7		63.6			27.6			23.8	16.3
Level of Service	E		D		E			C			C	B
Approach Delay (s)		57.6			63.6			27.6			21.7	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. & S Archer Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↱			↱	
Volume (vph)	172	1087	24	78	630	77	0	368	131	0	294	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1604	4630		1573	4323			1406			1523	
Flt Permitted	0.25	1.00		0.14	1.00			1.00			1.00	
Satd. Flow (perm)	417	4630		227	4323			1406			1523	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	189	1195	26	86	692	85	0	404	144	0	323	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	189	1221	0	86	777	0	0	548	0	0	389	0
Confl. Peds. (#/hr)	5		32	32		5			27			19
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	3%	2%	8%	5%	4%	4%	100%	7%	5%	7%	12%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	45.6	37.0		39.2	33.6			44.4			44.4	
Effective Green, g (s)	45.6	37.0		39.2	33.6			44.4			44.4	
Actuated g/C Ratio	0.46	0.37		0.39	0.34			0.44			0.44	
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	296	1713		164	1452			624			676	
v/s Ratio Prot	c0.06	c0.26		0.03	0.18			c0.39			0.26	
v/s Ratio Perm	0.23			0.18								
v/c Ratio	0.64	0.71		0.52	0.54			0.88			0.58	
Uniform Delay, d1	17.6	27.0		20.6	26.9			25.3			20.8	
Progression Factor	1.00	1.00		1.00	1.00			0.82			0.82	
Incremental Delay, d2	6.2	1.4		3.0	1.4			15.3			2.7	
Delay (s)	23.8	28.4		23.6	28.3			36.1			19.6	
Level of Service	C	C		C	C			D			B	
Approach Delay (s)		27.8			27.8			36.1			19.6	
Approach LOS		C			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1115: Ashland Ave. & W Robinson St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑	↱	↰	↑			↑↱	
Volume (vph)	0	0	0	31	22	9	111	476	16	0	270	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	2.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	
Frpb, ped/bikes					1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes					0.98	1.00	0.99	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.98	
Flt Protected					0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1600	1490	1289	1616			1500	
Flt Permitted					0.97	1.00	0.52	1.00			1.00	
Satd. Flow (perm)					1600	1490	707	1616			1500	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	34	24	10	122	523	18	0	297	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	58	10	122	541	0	0	363	0
Confl. Peds. (#/hr)	1		5	5		1	17		6			17
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	9%	0%	27%	7%	6%	3%	13%	8%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					7.9	7.9	86.1	84.1			71.1	
Effective Green, g (s)					7.9	7.9	86.1	84.1			71.1	
Actuated g/C Ratio					0.08	0.08	0.86	0.84			0.71	
Clearance Time (s)					4.0	4.0	2.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					126	117	672	1359			1066	
v/s Ratio Prot							0.02	c0.33			0.24	
v/s Ratio Perm					0.04	0.01	0.14					
v/c Ratio					0.46	0.09	0.18	0.40			0.34	
Uniform Delay, d1					44.0	42.7	1.8	1.9			5.5	
Progression Factor					1.00	1.00	0.45	0.46			0.33	
Incremental Delay, d2					2.7	0.3	0.1	0.8			0.7	
Delay (s)					46.7	43.0	0.9	1.7			2.6	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			46.1			1.6			2.6	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1118: Ashland Ave. & W 33rd St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			↑			↑	
Volume (vph)	52	45	29	0	0	26	0	367	2	0	245	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99			0.98			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.94			0.86			1.00			1.00	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1706	1675			1279			1010			1343	
Flt Permitted	0.74	1.00			1.00			1.00			1.00	
Satd. Flow (perm)	1326	1675			1279			1010			1343	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.91	0.92	0.91	0.91	0.93	0.91	0.91
Adj. Flow (vph)	57	49	32	0	0	29	0	403	2	0	269	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	57	81	0	0	29	0	0	405	0	0	269	0
Confl. Peds. (#/hr)	1		3			1			3			3
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	2%	2%	19%	2%	12%	0%	14%	14%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	21.0	21.0			21.0			71.0			71.0	
Effective Green, g (s)	21.0	21.0			21.0			71.0			71.0	
Actuated g/C Ratio	0.21	0.21			0.21			0.71			0.71	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	278	351			268			717			953	
v/s Ratio Prot		c0.05			0.02			c0.40			0.20	
v/s Ratio Perm	0.04											
v/c Ratio	0.21	0.23			0.11			0.56			0.28	
Uniform Delay, d1	32.6	32.8			31.9			7.0			5.3	
Progression Factor	1.00	1.00			1.00			0.44			0.42	
Incremental Delay, d2	1.7	1.5			0.8			2.7			0.7	
Delay (s)	34.3	34.3			32.7			5.8			2.9	
Level of Service	C	C			C			A			A	
Approach Delay (s)		34.3			32.7			5.8			2.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1121: Ashland Ave. & W 35th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱	↱		↑	↱		↑	↱
Volume (vph)	56	267	78	37	145	91	0	419	24	0	241	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97		1.00	0.95		1.00	0.95
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1588	1514	1216	1588	1370	1108		1139	991		1099	1007
Flt Permitted	0.59	1.00	1.00	0.42	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	989	1514	1216	707	1370	1108		1139	991		1099	1007
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	62	293	86	41	159	100	0	460	26	0	265	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	62	293	86	41	169	90	0	460	26	0	265	7
Confl. Peds. (#/hr)	3		4	4		3			8			10
Confl. Bikes (#/hr)						1			2			3
Heavy Vehicles (%)	0%	11%	14%	0%	15%	19%	14%	13%	4%	17%	14%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0		60.0	60.0		60.0	60.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0		60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31		0.60	0.60		0.60	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	306	469	376	219	424	343		683	594		659	604
v/s Ratio Prot		c0.19			0.12			c0.40			0.24	
v/s Ratio Perm	0.06		0.07	0.06		0.08			0.03			0.01
v/c Ratio	0.20	0.62	0.23	0.19	0.40	0.26		0.67	0.04		0.40	0.01
Uniform Delay, d1	25.4	29.5	25.6	25.3	27.2	25.9		13.4	8.2		10.5	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.54	0.67		0.71	0.71
Incremental Delay, d2	1.5	6.2	1.4	1.9	2.8	1.9		4.4	0.1		1.8	0.0
Delay (s)	26.9	35.7	27.0	27.2	29.9	27.8		11.7	5.6		9.3	5.7
Level of Service	C	D	C	C	C	C		B	A		A	A
Approach Delay (s)		32.8			28.9			11.3			9.2	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	34	34	34	10	21	21	0	553	14	0	426	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.95			0.95			1.00			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1550			1290			1419			1407	
Flt Permitted		0.88			0.95			1.00			1.00	
Satd. Flow (perm)		1395			1236			1419			1407	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	37	37	37	11	23	23	0	608	15	0	468	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	57	0	0	623	0	0	486	0
Confl. Peds. (#/hr)	10		2	2		10			2			7
Heavy Vehicles (%)	0%	21%	0%	20%	0%	59%	5%	10%	7%	19%	11%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		14.3			14.3			76.7			76.7	
Effective Green, g (s)		14.3			14.3			76.7			76.7	
Actuated g/C Ratio		0.14			0.14			0.77			0.77	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		199			176			1088			1079	
v/s Ratio Prot								c0.44			0.35	
v/s Ratio Perm		c0.08			0.05							
v/c Ratio		0.56			0.32			0.57			0.45	
Uniform Delay, d1		39.9			38.5			4.8			4.1	
Progression Factor		1.00			1.00			0.98			0.53	
Incremental Delay, d2		5.7			2.2			1.9			1.3	
Delay (s)		45.6			40.7			6.6			3.5	
Level of Service		D			D			A			A	
Approach Delay (s)		45.6			40.7			6.6			3.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1127: Ashland Ave. & W Pershing Rd.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	28	331	111	108	369	164	0	482	67	0	366	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1450	2926	1345	1333	2875	992		1294	1134		1253	1106
Flt Permitted	0.51	1.00	1.00	0.37	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	784	2926	1345	524	2875	992		1294	1134		1253	1106
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	31	364	122	119	405	180	0	530	74	0	402	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	31	364	122	119	405	180	0	530	74	0	402	20
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)						1						3
Heavy Vehicles (%)	14%	13%	10%	24%	15%	46%	1%	21%	16%	16%	25%	17%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	29.8	26.2	26.2	39.2	32.6	32.6		54.8	54.8		54.8	54.8
Effective Green, g (s)	29.8	26.2	26.2	39.2	32.6	32.6		54.8	54.8		54.8	54.8
Actuated g/C Ratio	0.30	0.26	0.26	0.39	0.33	0.33		0.55	0.55		0.55	0.55
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	257	766	352	286	937	323		709	621		686	606
v/s Ratio Prot	0.00	0.12		c0.04	0.14			c0.41			0.32	
v/s Ratio Perm	0.03		0.09	0.12		c0.18			0.07			0.02
v/c Ratio	0.12	0.48	0.35	0.42	0.43	0.56		0.75	0.12		0.59	0.03
Uniform Delay, d1	25.2	31.1	30.0	20.8	26.4	27.8		17.3	10.9		15.0	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.72	0.67		0.91	0.97
Incremental Delay, d2	0.2	2.1	2.7	1.0	1.5	6.8		6.5	0.4		1.2	0.0
Delay (s)	25.4	33.2	32.6	21.7	27.9	34.5		19.0	7.6		14.9	10.1
Level of Service	C	C	C	C	C	C		B	A		B	B
Approach Delay (s)		32.6			28.6			17.6			14.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↳	
Volume (vph)	85	33	0	520	286	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	11	11	11	11
Total Lost time (s)	5.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.96			1.00	0.98	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1532			1198	1555	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1532			1198	1555	
Peak-hour factor, PHF	0.91	0.91	0.96	0.91	0.91	0.91
Adj. Flow (vph)	93	36	0	571	314	65
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	129	0	0	571	379	0
Confl. Peds. (#/hr)	2	1				4
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	12%	0%	6%	7%	17%
Parking (#/hr)				34		
Turn Type	NA			NA	NA	
Protected Phases	4			2 9	6	
Permitted Phases						
Actuated Green, G (s)	16.0			74.0	67.0	
Effective Green, g (s)	16.0			74.0	67.0	
Actuated g/C Ratio	0.16			0.74	0.67	
Clearance Time (s)	5.0				3.0	
Vehicle Extension (s)	8.0				3.0	
Lane Grp Cap (vph)	245			886	1041	
v/s Ratio Prot	c0.08			c0.48	0.24	
v/s Ratio Perm						
v/c Ratio	0.53			0.64	0.36	
Uniform Delay, d1	38.5			6.5	7.2	
Progression Factor	1.00			0.10	0.94	
Incremental Delay, d2	7.4			1.2	0.9	
Delay (s)	45.9			1.9	7.7	
Level of Service	D			A	A	
Approach Delay (s)	45.9			1.9	7.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1131: Ashland Ave. & W 42nd Pl.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑			↳	
Volume (vph)	0	0	5	2	0	2	0	589	0	0	500	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.93			1.00			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1557			1310			1477			1408	
Flt Permitted		1.00			0.93			1.00			1.00	
Satd. Flow (perm)		1557			1247			1477			1408	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.92	0.91	0.92	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	0	0	5	2	0	2	0	647	0	0	549	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	5	0	0	4	0	0	647	0	0	551	0
Confl. Peds. (#/hr)									5			13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	0%	0%	2%	50%	2%	6%	0%	67%	11%	50%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6 13	
Permitted Phases	4			8								
Actuated Green, G (s)		16.0			16.0			67.0			74.0	
Effective Green, g (s)		16.0			16.0			67.0			74.0	
Actuated g/C Ratio		0.16			0.16			0.67			0.74	
Clearance Time (s)		5.0			5.0			3.0				
Vehicle Extension (s)		8.0			8.0			3.0				
Lane Grp Cap (vph)		249			199			989			1041	
v/s Ratio Prot		c0.00						c0.44			c0.39	
v/s Ratio Perm					0.00							
v/c Ratio		0.02			0.02			0.65			0.53	
Uniform Delay, d1		35.4			35.4			9.7			5.6	
Progression Factor		1.00			1.00			0.75			0.66	
Incremental Delay, d2		0.1			0.2			2.8			0.5	
Delay (s)		35.5			35.6			10.1			4.1	
Level of Service		D			D			B			A	
Approach Delay (s)		35.5			35.6			10.1			4.1	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	108	248	56	24	118	66	0	459	39	0	278	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98		1.00	0.98		1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1503	1403		1457	1527	1247		1272	986		1165	886
Flt Permitted	0.67	1.00		0.40	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	1064	1403		616	1527	1247		1272	986		1165	886
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	119	273	62	26	130	73	0	504	43	0	305	78
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	119	335	0	26	130	73	0	504	43	0	305	78
Confl. Peds. (#/hr)	1		14	14		1			1			8
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	6%	18%	4%	8%	10%	12%	3%	4%	10%	22%	9%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	35.0	35.0		35.0	35.0	35.0		56.0	56.0		56.0	56.0
Effective Green, g (s)	35.0	35.0		35.0	35.0	35.0		56.0	56.0		56.0	56.0
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35		0.56	0.56		0.56	0.56
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	372	491		215	534	436		712	552		652	496
v/s Ratio Prot		c0.24			0.09			c0.40			0.26	
v/s Ratio Perm	0.11			0.04		0.06			0.04			0.09
v/c Ratio	0.32	0.68		0.12	0.24	0.17		0.71	0.08		0.47	0.16
Uniform Delay, d1	23.8	27.8		22.1	23.1	22.4		16.0	10.1		13.1	10.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.70	0.92		0.47	0.54
Incremental Delay, d2	2.3	7.5		1.1	1.1	0.8		4.7	0.2		2.1	0.6
Delay (s)	26.0	35.2		23.2	24.2	23.3		15.9	9.6		8.2	6.3
Level of Service	C	D		C	C	C		B	A		A	A
Approach Delay (s)		32.8			23.8			15.4			7.8	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1133: Ashland Ave. & W 44th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	38	15	20	13	9	0	581	44	0	400	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			1.00	
Flpb, ped/bikes		0.97			1.00			1.00			1.00	
Frt		0.98			0.97			0.99			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1616			1457			1346			1066	
Flt Permitted		0.87			0.82			1.00			1.00	
Satd. Flow (perm)		1437			1221			1346			1066	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	35	42	16	22	14	10	0	638	48	0	440	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	0	0	46	0	0	686	0	0	488	0
Confl. Peds. (#/hr)	16		2	2		16			2			9
Heavy Vehicles (%)	0%	5%	7%	10%	0%	44%	14%	5%	2%	10%	10%	16%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		10.6			10.6			80.4			80.4	
Effective Green, g (s)		10.6			10.6			80.4			80.4	
Actuated g/C Ratio		0.11			0.11			0.80			0.80	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		152			129			1082			857	
v/s Ratio Prot								c0.51			0.46	
v/s Ratio Perm		c0.06			0.04							
v/c Ratio		0.61			0.36			0.63			0.57	
Uniform Delay, d1		42.7			41.5			3.9			3.5	
Progression Factor		1.00			1.00			0.23			0.56	
Incremental Delay, d2		10.1			3.5			2.3			2.6	
Delay (s)		52.8			45.0			3.2			4.6	
Level of Service		D			D			A			A	
Approach Delay (s)		52.8			45.0			3.2			4.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	36	20	15	16	10	22	0	489	23	0	275	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			1.00			0.99	
Flpb, ped/bikes		0.98			0.99			1.00			1.00	
Frt		0.97			0.94			0.99			0.98	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1642			1548			1141			1085	
Flt Permitted		0.85			0.91			1.00			1.00	
Satd. Flow (perm)		1423			1429			1141			1085	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	40	22	16	18	11	24	0	537	25	0	302	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	78	0	0	53	0	0	562	0	0	349	0
Confl. Peds. (#/hr)	15		10	10		15			7			9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	0%	0%	7%	12%	0%	0%	10%	6%	4%	0%	11%	0%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			68.0			68.0	
Effective Green, g (s)		23.0			23.0			68.0			68.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		327			328			775			737	
v/s Ratio Prot								c0.49			0.32	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.24			0.16			0.73			0.47	
Uniform Delay, d1		31.4			30.8			10.1			7.6	
Progression Factor		1.00			1.00			0.55			0.87	
Incremental Delay, d2		1.7			1.1			4.7			1.9	
Delay (s)		33.1			31.8			10.2			8.4	
Level of Service		C			C			B			A	
Approach Delay (s)		33.1			31.8			10.2			8.4	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1135: Ashland Ave. & W 46th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	52	10	4	14	38	0	473	27	0	251	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.96			0.99			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.99			0.91			0.99			0.98	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1703			1516			1152			995	
Flt Permitted		0.89			0.99			1.00			1.00	
Satd. Flow (perm)		1549			1501			1152			995	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	35	57	11	4	15	42	0	520	30	0	276	45
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	103	0	0	61	0	0	550	0	0	321	0
Confl. Peds. (#/hr)	13		5	5		13			18			11
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	10%	0%	0%	5%	0%	6%	4%	2%	13%	7%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			72.0			72.0	
Effective Green, g (s)		20.0			20.0			72.0			72.0	
Actuated g/C Ratio		0.20			0.20			0.72			0.72	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		309			300			829			716	
v/s Ratio Prot								c0.48			0.32	
v/s Ratio Perm		c0.07			0.04							
v/c Ratio		0.33			0.20			0.66			0.45	
Uniform Delay, d1		34.3			33.4			7.5			5.8	
Progression Factor		1.00			1.00			0.52			0.90	
Incremental Delay, d2		2.9			1.5			3.4			1.8	
Delay (s)		37.2			34.9			7.3			7.1	
Level of Service		D			C			A			A	
Approach Delay (s)		37.2			34.9			7.3			7.1	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1136: Ashland Ave. & W 47th St./ S. McDowell Ave.

9/16/2013

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	100	293	40	60	256	48	7	361	16	56	192	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.89		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1425	2701		1527	2712			1071	1267		1398	1126
Flt Permitted	0.45	1.00		0.51	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	670	2701		812	2712			1071	1267		1398	1126
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	110	322	44	66	281	53	8	397	18	62	211	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	110	366	0	66	342	0	0	397	80	0	211	65
Confl. Peds. (#/hr)			27	27		51			33			44
Heavy Vehicles (%)	12%	16%	8%	3%	12%	15%	0%	4%	0%	5%	12%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								52			0	0
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	35.7	28.8		31.5	26.7			54.4	54.4		54.4	54.4
Effective Green, g (s)	35.7	28.8		31.5	26.7			54.4	54.4		54.4	54.4
Actuated g/C Ratio	0.36	0.29		0.32	0.27			0.54	0.54		0.54	0.54
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	291	777		290	724			582	689		760	612
v/s Ratio Prot	c0.03	c0.14		0.01	0.13			c0.37			0.15	
v/s Ratio Perm	0.11			0.06					0.06			0.06
v/c Ratio	0.38	0.47		0.23	0.47			0.68	0.12		0.28	0.11
Uniform Delay, d1	22.6	29.3		24.5	30.7			16.5	11.1		12.2	11.0
Progression Factor	1.00	1.00		1.00	1.00			0.40	0.35		0.73	0.75
Incremental Delay, d2	0.8	2.0		0.4	2.2			4.0	0.2		0.8	0.3
Delay (s)	23.4	31.4		24.9	32.9			10.5	4.1		9.8	8.6
Level of Service	C	C		C	C			B	A		A	A
Approach Delay (s)		29.5			31.7			9.5			9.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SWR2
Lane Configurations	↱
Volume (vph)	3
Ideal Flow (vphpl)	1800
Lane Width	12
Total Lost time (s)	5.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	1557
Flt Permitted	1.00
Satd. Flow (perm)	1557
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	3
RTOR Reduction (vph)	0
Lane Group Flow (vph)	3
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	26.7
Effective Green, g (s)	26.7
Actuated g/C Ratio	0.27
Clearance Time (s)	5.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	415
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	26.9
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	26.9
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1137: Ashland Ave. & W 48th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑			↱	
Volume (vph)	0	0	0	16	55	16	0	582	0	0	250	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.98	
Flpb, ped/bikes					0.98			1.00			1.00	
Frt					0.97			1.00			0.98	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1594			1205			1014	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1594			1205			1014	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	18	60	18	0	640	0	0	275	57
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	96	0	0	640	0	0	332	0
Confl. Peds. (#/hr)			56	56		33			2			19
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	4%	12%	9%	4%	0%	0%	7%	8%
Parking (#/hr)								36			50	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			68.0			68.0	
Effective Green, g (s)					23.0			68.0			68.0	
Actuated g/C Ratio					0.23			0.68			0.68	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					366			819			689	
v/s Ratio Prot								c0.53			0.33	
v/s Ratio Perm					0.06							
v/c Ratio					0.26			0.78			0.48	
Uniform Delay, d1					31.5			10.9			7.6	
Progression Factor					1.00			0.48			1.09	
Incremental Delay, d2					1.7			6.5			2.3	
Delay (s)					33.3			11.7			10.6	
Level of Service					C			B			B	
Approach Delay (s)		0.0			33.3			11.7			10.6	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1138: Ashland Ave. & W 49th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	48	40	30	16	19	10	0	410	37	0	197	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.97			0.99			0.99	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1697			1634			1112			1029	
Flt Permitted		0.86			0.89			1.00			1.00	
Satd. Flow (perm)		1496			1481			1112			1029	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	53	44	33	18	21	11	0	451	41	0	216	23
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	130	0	0	50	0	0	492	0	0	239	0
Confl. Peds. (#/hr)	5					5			14			4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	12%	0%	0%	0%	5%	0%	0%	9%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			67.0			67.0	
Effective Green, g (s)		24.0			24.0			67.0			67.0	
Actuated g/C Ratio		0.24			0.24			0.67			0.67	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		359			355			745			689	
v/s Ratio Prot								c0.44			0.23	
v/s Ratio Perm		c0.09			0.03							
v/c Ratio		0.36			0.14			0.66			0.35	
Uniform Delay, d1		31.6			29.9			9.8			7.1	
Progression Factor		1.00			1.00			0.57			0.42	
Incremental Delay, d2		2.8			0.8			3.6			1.2	
Delay (s)		34.4			30.7			9.1			4.2	
Level of Service		C			C			A			A	
Approach Delay (s)		34.4			30.7			9.1			4.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	26	34	8	16	18	26	0	450	15	0	211	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.97			1.00			0.99	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.98			0.94			1.00			0.98	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1697			1607			1112			1387	
Flt Permitted		0.88			0.93			1.00			1.00	
Satd. Flow (perm)		1529			1507			1112			1387	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	29	37	9	18	20	29	0	495	16	0	232	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	75	0	0	67	0	0	511	0	0	262	0
Confl. Peds. (#/hr)	19		26	26		19			8			8
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	12%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			68.0			68.0	
Effective Green, g (s)		23.0			23.0			68.0			68.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		351			346			756			943	
v/s Ratio Prot								c0.46			0.19	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.21			0.19			0.68			0.28	
Uniform Delay, d1		31.2			31.0			9.5			6.3	
Progression Factor		1.00			1.00			0.37			1.01	
Incremental Delay, d2		1.4			1.2			4.2			0.7	
Delay (s)		32.6			32.3			7.8			7.1	
Level of Service		C			C			A			A	
Approach Delay (s)		32.6			32.3			7.8			7.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1140: Ashland Ave. & W 51st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	112	318	29	46	196	55	0	349	40	0	168	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.96		1.00	0.94		1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1519	1556	1259	1510	1585	1287		1154	926		983	867
Flt Permitted	0.56	1.00	1.00	0.40	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	901	1556	1259	636	1585	1287		1154	926		983	867
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	123	349	32	51	215	60	0	384	44	0	185	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	123	349	32	51	215	60	0	384	44	0	185	38
Confl. Peds. (#/hr)	5		12	12		5			14			4
Heavy Vehicles (%)	4%	8%	7%	4%	6%	7%	3%	4%	2%	8%	15%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	37.0	37.0	37.0	37.0	37.0	37.0		54.0	54.0		54.0	54.0
Effective Green, g (s)	37.0	37.0	37.0	37.0	37.0	37.0		54.0	54.0		54.0	54.0
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37		0.54	0.54		0.54	0.54
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	333	575	465	235	586	476		623	500		530	468
v/s Ratio Prot		c0.22			0.14			c0.33			0.19	
v/s Ratio Perm	0.14		0.03	0.08		0.05			0.05			0.04
v/c Ratio	0.37	0.61	0.07	0.22	0.37	0.13		0.62	0.09		0.35	0.08
Uniform Delay, d1	23.0	25.6	20.4	21.6	23.0	20.8		15.9	11.1		13.0	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.30	0.48		0.58	0.58
Incremental Delay, d2	3.1	4.7	0.3	2.1	1.8	0.5		3.7	0.3		1.8	0.3
Delay (s)	26.1	30.3	20.6	23.7	24.7	21.4		8.4	5.6		9.3	6.8
Level of Service	C	C	C	C	C	C		A	A		A	A
Approach Delay (s)		28.7			23.9			8.1			8.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1142: Ashland Ave. & W 53rd St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣			↑			↱	
Volume (vph)	0	0	0	8	9	13	0	451	0	0	196	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.94			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1590			1205			1021	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1590			1205			1021	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	9	10	14	0	496	0	0	215	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	33	0	0	496	0	0	233	0
Confl. Peds. (#/hr)			13	13		2			13			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	8%	0%	4%	0%	20%	11%	12%
Parking (#/hr)								36			48	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			68.0			68.0	
Effective Green, g (s)					23.0			68.0			68.0	
Actuated g/C Ratio					0.23			0.68			0.68	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					365			819			694	
v/s Ratio Prot								c0.41			0.23	
v/s Ratio Perm					0.02							
v/c Ratio					0.09			0.61			0.34	
Uniform Delay, d1					30.3			8.7			6.6	
Progression Factor					1.00			0.22			0.50	
Incremental Delay, d2					0.5			2.7			1.3	
Delay (s)					30.8			4.7			4.6	
Level of Service					C			A			A	
Approach Delay (s)		0.0			30.8			4.7			4.6	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1144: Ashland Ave. & W Garfield Blvd. (WB)

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑			↑	↱
Volume (vph)	0	0	0	138	738	29	0	427	0	0	152	70
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	11	11	11	11	11	11
Total Lost time (s)				5.0	5.0	5.0		3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes				1.00	1.00	0.89		1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00		1.00			1.00	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1524	3069	1266		1477			1084	970
Flt Permitted				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1524	3069	1266		1477			1084	970
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	152	811	32	0	469	0	0	167	77
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	152	811	32	0	469	0	0	167	77
Confl. Peds. (#/hr)						57			12			14
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	1%	4%	0%	4%	6%	0%	0%	14%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm		NA			NA	Perm
Protected Phases					8			2 5			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				40.0	40.0	40.0		46.0			43.0	43.0
Effective Green, g (s)				40.0	40.0	40.0		46.0			43.0	43.0
Actuated g/C Ratio				0.40	0.40	0.40		0.46			0.43	0.43
Clearance Time (s)				5.0	5.0	5.0					3.0	3.0
Lane Grp Cap (vph)				609	1227	506		679			466	417
v/s Ratio Prot					c0.26			c0.32			0.15	
v/s Ratio Perm				0.10		0.03						0.08
v/c Ratio				0.25	0.66	0.06		0.69			0.36	0.18
Uniform Delay, d1				20.0	24.5	18.5		21.4			19.2	17.6
Progression Factor				1.00	1.00	1.00		0.38			1.07	1.08
Incremental Delay, d2				1.0	2.8	0.2		4.2			2.1	1.0
Delay (s)				21.0	27.3	18.7		12.3			22.6	20.0
Level of Service				C	C	B		B			C	B
Approach Delay (s)		0.0			26.0			12.3			21.8	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1145: Ashland Ave. & W Garfield Blvd. (EB)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱					↑	↱		↑	
Volume (vph)	76	936	63	0	0	0	0	376	164	0	254	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0		5.0	
Lane Util. Factor	1.00	0.95	1.00					1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.90					1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1477	3011	1191					1248	1077		1437	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1477	3011	1191					1248	1077		1437	
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	84	1029	69	0	0	0	0	413	180	0	279	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	1029	69	0	0	0	0	413	180	0	279	0
Confl. Peds. (#/hr)	1		48			1			10			6
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	6%	8%	0%	0%	0%	0%	6%	2%	4%	9%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			1 6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	40.0	40.0	40.0					42.0	42.0		48.0	
Effective Green, g (s)	40.0	40.0	40.0					42.0	42.0		48.0	
Actuated g/C Ratio	0.40	0.40	0.40					0.42	0.42		0.48	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0			
Lane Grp Cap (vph)	590	1204	476					524	452		689	
v/s Ratio Prot		c0.34						c0.33			c0.19	
v/s Ratio Perm	0.06		0.06						0.17			
v/c Ratio	0.14	0.85	0.14					0.79	0.40		0.40	
Uniform Delay, d1	19.1	27.3	19.1					25.1	20.2		16.8	
Progression Factor	1.00	1.00	1.00					0.94	1.02		1.21	
Incremental Delay, d2	0.5	7.8	0.6					7.5	1.7		1.7	
Delay (s)	19.6	35.2	19.7					31.2	22.3		22.0	
Level of Service	B	D	B					C	C		C	
Approach Delay (s)		33.2			0.0			28.5			22.0	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	107.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	22	10	34	0	0	0	0	592	8	0	261	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.97						1.00			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.93						1.00			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1544						1167			1063	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1544						1167			1063	
Peak-hour factor, PHF	0.91	0.91	0.91	0.95	0.95	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	24	11	37	0	0	0	0	651	9	0	287	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	72	0	0	0	0	0	660	0	0	287	0
Confl. Peds. (#/hr)	7		17			7			10			23
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	6%	0%	0%	0%	0%	4%	12%	0%	8%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						68.0			68.0	
Effective Green, g (s)		23.0						68.0			68.0	
Actuated g/C Ratio		0.23						0.68			0.68	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		355						793			722	
v/s Ratio Prot								c0.57			0.27	
v/s Ratio Perm		0.05										
v/c Ratio		0.20						0.83			0.40	
Uniform Delay, d1		31.1						11.8			7.0	
Progression Factor		1.00						0.37			0.73	
Incremental Delay, d2		1.3						7.4			1.5	
Delay (s)		32.4						11.8			6.6	
Level of Service		C						B			A	
Approach Delay (s)		32.4			0.0			11.8			6.6	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1150: Ashland Ave. & W 59th St.

9/16/2013

	↰	→	↱	↰	←	↱	↰	↑	↱	↰	↓	↱
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	76	302	39	51	273	37	0	505	33	0	245	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.79	1.00	1.00	0.96		1.00	0.98		1.00	0.90
Flpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1432	1527	1070	1493	1615	1266		1288	1099		1437	1089
Flt Permitted	0.41	1.00	1.00	0.36	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	617	1527	1070	573	1615	1266		1288	1099		1437	1089
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	84	332	43	56	300	41	0	555	36	0	269	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	332	43	56	300	41	0	555	36	0	269	36
Confl. Peds. (#/hr)	7		63	63		7			1			25
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	11%	10%	5%	4%	4%	8%	2%	4%	0%	7%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.6	30.6	30.6	34.6	30.6	30.6		53.4	53.4		53.4	53.4
Effective Green, g (s)	34.6	30.6	30.6	34.6	30.6	30.6		53.4	53.4		53.4	53.4
Actuated g/C Ratio	0.35	0.31	0.31	0.35	0.31	0.31		0.53	0.53		0.53	0.53
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	246	467	327	235	494	387		687	586		767	581
v/s Ratio Prot	c0.01	c0.22		0.01	0.19			c0.43			0.19	
v/s Ratio Perm	0.10		0.04	0.07		0.03			0.03			0.03
v/c Ratio	0.34	0.71	0.13	0.24	0.61	0.11		0.81	0.06		0.35	0.06
Uniform Delay, d1	23.3	30.8	25.1	22.8	29.6	24.9		19.1	11.2		13.4	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.65	0.92		0.61	0.63
Incremental Delay, d2	0.8	8.9	0.8	0.5	5.5	0.6		6.1	0.1		1.2	0.2
Delay (s)	24.1	39.7	25.9	23.4	35.0	25.4		18.4	10.4		9.4	7.3
Level of Service	C	D	C	C	D	C		B	B		A	A
Approach Delay (s)		35.5			32.4			18.0			9.1	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1152: Ashland Ave. & W 61st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	32	32	85	0	0	0	0	572	45	0	309	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.92						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1749						1232			1015	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1749						1232			1015	
Peak-hour factor, PHF	0.91	0.91	0.91	0.99	0.99	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	35	35	93	0	0	0	0	629	49	0	340	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	163	0	0	0	0	0	678	0	0	340	0
Confl. Peds. (#/hr)	6		7			6			16			24
Heavy Vehicles (%)	19%	0%	0%	0%	0%	0%	0%	3%	2%	14%	8%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						68.0			68.0	
Effective Green, g (s)		23.0						68.0			68.0	
Actuated g/C Ratio		0.23						0.68			0.68	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		402						837			690	
v/s Ratio Prot								c0.55			0.33	
v/s Ratio Perm		0.09										
v/c Ratio		0.41						0.81			0.49	
Uniform Delay, d1		32.7						11.4			7.7	
Progression Factor		1.00						1.00			0.93	
Incremental Delay, d2		3.0						8.4			2.4	
Delay (s)		35.7						19.8			9.6	
Level of Service		D						B			A	
Approach Delay (s)		35.7			0.0			19.8			9.6	
Approach LOS		D			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	59	493	83	71	462	44	0	475	60	0	311	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	10	10	12	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00			1.00	0.90		1.00	0.91
Flpb, ped/bikes	0.99	1.00	1.00	0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1488	1527	1178	1457	1580			1673	1145		1626	1208
Flt Permitted	0.31	1.00	1.00	0.32	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	479	1527	1178	488	1580			1673	1145		1626	1208
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	65	542	91	78	508	48	0	522	66	0	342	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	542	91	78	556	0	0	522	66	0	342	49
Confl. Peds. (#/hr)	19		76	76		19			42			37
Heavy Vehicles (%)	14%	10%	9%	6%	5%	0%	5%	4%	3%	2%	7%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0			
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0			27.0	27.0		27.0	27.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0			27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48			0.42	0.42		0.42	0.42
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	228	728	561	232	753			694	475		675	501
v/s Ratio Prot		c0.35			0.35			c0.31			0.21	
v/s Ratio Perm	0.14		0.08	0.16					0.06			0.04
v/c Ratio	0.29	0.74	0.16	0.34	0.74			0.75	0.14		0.51	0.10
Uniform Delay, d1	10.3	13.8	9.6	10.6	13.7			16.2	11.8		14.1	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.78	0.69		1.00	1.00
Incremental Delay, d2	3.1	6.8	0.6	3.9	6.4			6.1	0.5		2.7	0.4
Delay (s)	13.4	20.6	10.3	14.5	20.1			18.8	8.6		16.8	12.0
Level of Service	B	C	B	B	C			B	A		B	B
Approach Delay (s)		18.6			19.4			17.7			16.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↱			↱	
Volume (vph)	0	0	0	36	14	56	0	612	0	0	246	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.93			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1710			1422			1141	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1710			1422			1141	
Peak-hour factor, PHF	0.95	0.95	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	0	0	0	40	15	62	0	673	0	0	270	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	117	0	0	673	0	0	297	0
Confl. Peds. (#/hr)			22	22		6			27			26
Heavy Vehicles (%)	0%	0%	0%	6%	0%	2%	0%	4%	0%	0%	8%	4%
Parking (#/hr)								10			36	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					8.0			48.0			48.0	
Effective Green, g (s)					8.0			48.0			48.0	
Actuated g/C Ratio					0.12			0.74			0.74	
Clearance Time (s)					5.0			4.0			4.0	
Vehicle Extension (s)					5.0			3.0			3.0	
Lane Grp Cap (vph)					210			1050			842	
v/s Ratio Prot								c0.47			0.26	
v/s Ratio Perm					0.07							
v/c Ratio					0.56			0.64			0.35	
Uniform Delay, d1					26.8			4.2			3.0	
Progression Factor					1.00			1.00			0.27	
Incremental Delay, d2					5.4			3.0			1.1	
Delay (s)					32.2			7.2			1.9	
Level of Service					C			A			A	
Approach Delay (s)		0.0			32.2			7.2			1.9	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1158: Ashland Ave. & W Marquette Rd.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↱			↱	
Volume (vph)	94	360	40	66	260	63	0	479	25	0	247	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96		1.00			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1532	1663	1373	1490	1631	1349		1223			1082	
Flt Permitted	0.47	1.00	1.00	0.33	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	751	1663	1373	511	1631	1349		1223			1082	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.98	0.91	0.91	0.98	0.91	0.91
Adj. Flow (vph)	103	396	44	73	286	69	0	526	27	0	271	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	103	396	44	73	286	69	0	553	0	0	298	0
Confl. Peds. (#/hr)	11		12	12		11			20			18
Heavy Vehicles (%)	0%	1%	0%	3%	3%	2%	0%	0%	0%	10%	7%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	34.6	30.6	30.6	34.6	30.6	30.6		42.4			42.4	
Effective Green, g (s)	34.6	30.6	30.6	34.6	30.6	30.6		42.4			42.4	
Actuated g/C Ratio	0.38	0.34	0.34	0.38	0.34	0.34		0.47			0.47	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	323	565	466	239	554	458		576			509	
v/s Ratio Prot	c0.01	c0.24		0.01	0.18			c0.45			0.28	
v/s Ratio Perm	0.11		0.03	0.10		0.05						
v/c Ratio	0.32	0.70	0.09	0.31	0.52	0.15		0.96			0.59	
Uniform Delay, d1	18.5	25.7	20.3	18.8	23.8	20.7		23.0			17.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.75			1.00	
Incremental Delay, d2	0.6	7.1	0.4	0.7	3.4	0.7		23.4			4.9	
Delay (s)	19.1	32.8	20.7	19.5	27.2	21.4		40.8			22.2	
Level of Service	B	C	C	B	C	C		D			C	
Approach Delay (s)		29.2			24.9			40.8			22.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑	↱		↑	↱		↑	↱
Volume (vph)	76	357	49	44	197	30	0	439	41	0	275	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.89		1.00	0.91		1.00	0.90
Flpb, ped/bikes		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Frt		0.98			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		3032			1595	1283		1138	1324		1018	1252
Flt Permitted		0.78			0.82	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		2374			1312	1283		1138	1324		1018	1252
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	84	392	54	48	216	33	0	482	45	0	302	56
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	530	0	0	264	33	0	482	45	0	302	56
Confl. Peds. (#/hr)	47		48	48		47			48			32
Heavy Vehicles (%)	0%	6%	0%	0%	9%	3%	6%	4%	2%	4%	6%	6%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)		28.0			28.0	28.0		53.0	53.0		53.0	53.0
Effective Green, g (s)		28.0			28.0	28.0		53.0	53.0		53.0	53.0
Actuated g/C Ratio		0.31			0.31	0.31		0.59	0.59		0.59	0.59
Clearance Time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		738			408	399		670	779		599	737
v/s Ratio Prot								c0.42			0.30	
v/s Ratio Perm		c0.22			0.20	0.03			0.03			0.04
v/c Ratio		0.72			0.65	0.08		0.72	0.06		0.50	0.08
Uniform Delay, d1		27.5			26.7	21.9		13.2	7.9		10.8	8.0
Progression Factor		1.00			1.00	1.00		0.66	0.96		0.62	0.43
Incremental Delay, d2		5.9			7.7	0.4		4.8	0.1		2.8	0.2
Delay (s)		33.4			34.5	22.3		13.5	7.6		9.5	3.6
Level of Service		C			C	C		B	A		A	A
Approach Delay (s)		33.4			33.1			13.0			8.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. & W 71st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↱			↱	
Volume (vph)	73	326	32	40	322	65	0	526	13	0	263	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.94		1.00			1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1586	1647	1316	1512	1615	1315		1413			1468	
Flt Permitted	0.34	1.00	1.00	0.37	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	568	1647	1316	590	1615	1315		1413			1468	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	80	358	35	44	354	71	0	578	14	0	289	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	80	358	35	44	354	71	0	592	0	0	319	0
Confl. Peds. (#/hr)	24		18	18		24			7			8
Heavy Vehicles (%)	0%	2%	3%	5%	4%	2%	8%	4%	15%	7%	5%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	33.2	29.2	29.2	31.2	28.2	28.2		45.8			45.8	
Effective Green, g (s)	33.2	29.2	29.2	31.2	28.2	28.2		45.8			45.8	
Actuated g/C Ratio	0.37	0.32	0.32	0.35	0.31	0.31		0.51			0.51	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	254	534	426	235	506	412		719			747	
v/s Ratio Prot	c0.01	0.22		0.01	c0.22			c0.42			0.22	
v/s Ratio Perm	0.10		0.03	0.06		0.05						
v/c Ratio	0.31	0.67	0.08	0.19	0.70	0.17		0.82			0.43	
Uniform Delay, d1	19.6	26.2	21.1	20.3	27.2	22.4		18.7			13.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.40			1.29	
Incremental Delay, d2	0.7	6.6	0.4	0.4	7.8	0.9		8.7			1.5	
Delay (s)	20.3	32.8	21.5	20.7	35.0	23.3		16.2			19.4	
Level of Service	C	C	C	C	D	C		B			B	
Approach Delay (s)		29.9			31.9			16.2			19.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1168: Ashland Ave. & W 74th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↑	↱		↑	↱
Volume (vph)	51	204	29	29	136	39	0	492	15	0	319	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.92		1.00	0.97		1.00	0.91		1.00	0.92
Flpb, ped/bikes		1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1575	1122		1577	1233		1506	1252		1477	1254
Flt Permitted		0.90	1.00		0.91	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1438	1122		1449	1233		1506	1252		1477	1254
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.97	0.91	0.91	0.97	0.91	0.91
Adj. Flow (vph)	56	224	32	32	149	43	0	541	16	0	351	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	280	32	0	181	43	0	541	16	0	351	24
Confl. Peds. (#/hr)	7		33	33		7			27			20
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	22%	6%	17%	0%	6%	12%	9%	4%	7%	5%	6%	9%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		31.0	31.0		31.0	31.0		50.0	50.0		50.0	50.0
Effective Green, g (s)		31.0	31.0		31.0	31.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio		0.34	0.34		0.34	0.34		0.56	0.56		0.56	0.56
Clearance Time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		495	386		499	424		836	695		820	696
v/s Ratio Prot								c0.36			0.24	
v/s Ratio Perm		c0.19	0.03		0.12	0.03			0.01			0.02
v/c Ratio		0.57	0.08		0.36	0.10		0.65	0.02		0.43	0.03
Uniform Delay, d1		24.0	19.9		22.1	20.0		13.9	9.0		11.7	9.1
Progression Factor		1.00	1.00		1.00	1.00		0.83	0.68		0.71	0.62
Incremental Delay, d2		4.6	0.4		2.0	0.5		2.7	0.0		1.6	0.1
Delay (s)		28.6	20.3		24.1	20.5		14.1	6.2		9.9	5.7
Level of Service		C	C		C	C		B	A		A	A
Approach Delay (s)		27.8			23.4			13.9			9.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

1170: Ashland Ave. & W 76th St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↑↱			↑↱	
Volume (vph)	46	309	17	44	208	53	0	518	39	0	206	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.99			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		3060			3009			1257			1150	
Flt Permitted		0.86			0.83			1.00			1.00	
Satd. Flow (perm)		2647			2526			1257			1150	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	51	340	19	48	229	58	0	569	43	0	226	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	410	0	0	335	0	0	612	0	0	237	0
Confl. Peds. (#/hr)	1		9	9		1			5			2
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	3%	6%	0%	2%	4%	0%	4%	5%	7%	7%	0%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			57.0			57.0	
Effective Green, g (s)		24.0			24.0			57.0			57.0	
Actuated g/C Ratio		0.27			0.27			0.63			0.63	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		705			673			796			728	
v/s Ratio Prot								c0.49			0.21	
v/s Ratio Perm		c0.15			0.13							
v/c Ratio		0.58			0.50			0.77			0.33	
Uniform Delay, d1		28.6			27.9			11.8			7.6	
Progression Factor		1.00			1.00			0.61			1.18	
Incremental Delay, d2		3.5			2.6			5.2			1.1	
Delay (s)		32.1			30.5			12.4			10.1	
Level of Service		C			C			B			B	
Approach Delay (s)		32.1			30.5			12.4			10.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1173: Ashland Ave. & W 79th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	111	496	42	36	454	72	0	412	35	0	233	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.92		1.00	0.88		1.00	0.87
Flpb, ped/bikes	0.98	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1489	1541	1178	1413	1527	1159		1165	890		1143	820
Flt Permitted	0.26	1.00	1.00	0.21	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	407	1541	1178	316	1527	1159		1165	890		1143	820
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	122	545	46	40	499	79	0	453	38	0	256	30
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	122	545	46	40	499	79	0	453	38	0	256	30
Confl. Peds. (#/hr)	41		54	54		41			41			47
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	1%	9%	5%	6%	10%	9%	7%	6%	3%	10%	5%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	35.0	35.0	35.0	35.0	35.0		39.0	39.0		39.0	39.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0		39.0	39.0		39.0	39.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.43	0.43		0.43	0.43
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	158	599	458	122	593	450		504	385		495	355
v/s Ratio Prot		c0.35			0.33			c0.39			0.22	
v/s Ratio Perm	0.30		0.04	0.13		0.07			0.04			0.04
v/c Ratio	0.77	0.91	0.10	0.33	0.84	0.18		0.90	0.10		0.52	0.08
Uniform Delay, d1	24.0	26.0	17.5	19.3	25.0	18.0		23.7	15.1		18.6	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.50	0.41		0.67	0.58
Incremental Delay, d2	29.9	20.2	0.4	7.0	13.5	0.8		15.4	0.3		3.7	0.4
Delay (s)	53.9	46.2	17.9	26.3	38.5	18.9		27.3	6.5		16.1	9.1
Level of Service	D	D	B	C	D	B		C	A		B	A
Approach Delay (s)		45.7			35.2			25.7			15.4	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1175: Ashland Ave. & W 81st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations					↰	↱		↱			↱	
Volume (vph)	0	0	0	26	92	32	0	527	0	0	190	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)					5.0	5.0		4.0			4.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.96		1.00			0.98	
Flpb, ped/bikes					1.00	1.00		1.00			1.00	
Frt					1.00	0.85		1.00			0.98	
Flt Protected					0.99	1.00		1.00			1.00	
Satd. Flow (prot)					1625	1314		1149			1005	
Flt Permitted					0.99	1.00		1.00			1.00	
Satd. Flow (perm)					1625	1314		1149			1005	
Peak-hour factor, PHF	0.94	0.94	0.91	0.91	0.91	0.91	0.94	0.91	0.91	0.94	0.91	0.91
Adj. Flow (vph)	0	0	0	29	101	35	0	579	0	0	209	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	130	35	0	579	0	0	242	0
Confl. Peds. (#/hr)			11	11		12			5			41
Heavy Vehicles (%)	0%	0%	0%	8%	0%	4%	3%	3%	0%	0%	5%	3%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					23.0	23.0		58.0			58.0	
Effective Green, g (s)					23.0	23.0		58.0			58.0	
Actuated g/C Ratio					0.26	0.26		0.64			0.64	
Clearance Time (s)					5.0	5.0		4.0			4.0	
Lane Grp Cap (vph)					415	335		740			647	
v/s Ratio Prot								c0.50			0.24	
v/s Ratio Perm					0.08	0.03						
v/c Ratio					0.31	0.10		0.78			0.37	
Uniform Delay, d1					27.1	25.6		11.5			7.5	
Progression Factor					1.00	1.00		0.67			0.95	
Incremental Delay, d2					2.0	0.6		6.3			1.6	
Delay (s)					29.1	26.2		14.0			8.6	
Level of Service					C	C		B			A	
Approach Delay (s)		0.0			28.5			14.0			8.6	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1177: Ashland Ave. & W 83rd St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	59	287	71	52	250	39	0	506	49	0	225	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00			1.00	0.94		1.00	0.98
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1512	1647	1370	1547	3076			1301	1053		1061	917
Flt Permitted	0.53	1.00	1.00	0.38	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	836	1647	1370	621	3076			1301	1053		1061	917
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.99	0.91	0.91	0.99	0.91	0.91
Adj. Flow (vph)	65	315	78	57	275	43	0	556	54	0	247	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	65	315	78	57	318	0	0	556	54	0	247	15
Confl. Peds. (#/hr)	3		12	12		3			18			7
Heavy Vehicles (%)	5%	2%	0%	2%	1%	3%	2%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0			55.0	55.0		55.0	55.0
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0			55.0	55.0		55.0	55.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29			0.61	0.61		0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	241	475	395	179	888			795	643		648	560
v/s Ratio Prot		c0.19			0.10			c0.43			0.23	
v/s Ratio Perm	0.08		0.06	0.09					0.05			0.02
v/c Ratio	0.27	0.66	0.20	0.32	0.36			0.70	0.08		0.38	0.03
Uniform Delay, d1	24.7	28.1	24.1	25.1	25.4			11.9	7.2		8.9	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.60	0.67		0.84	1.09
Incremental Delay, d2	2.7	7.1	1.1	4.6	1.1			3.0	0.2		1.6	0.1
Delay (s)	27.4	35.3	25.3	29.7	26.5			10.2	4.9		9.1	7.6
Level of Service	C	D	C	C	C			B	A		A	A
Approach Delay (s)		32.5			27.0			9.7			9.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1179: Ashland Ave. & W 85th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	60	47	31	0	0	0	0	597	55	0	318	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1627						1125			1127	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1627						1125			1127	
Peak-hour factor, PHF	0.91	0.91	0.91	0.90	0.90	0.91	0.90	0.91	0.91	0.90	0.91	0.91
Adj. Flow (vph)	66	52	34	0	0	0	0	656	60	0	349	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	152	0	0	0	0	0	716	0	0	349	0
Confl. Peds. (#/hr)	7		8			7			13			11
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	0%	6%	0%	0%	0%	0%	5%	4%	0%	5%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		11.9						69.1			69.1	
Effective Green, g (s)		11.9						69.1			69.1	
Actuated g/C Ratio		0.13						0.77			0.77	
Clearance Time (s)		5.0						4.0			4.0	
Vehicle Extension (s)		6.0						3.0			3.0	
Lane Grp Cap (vph)		215						863			865	
v/s Ratio Prot								c0.64			0.31	
v/s Ratio Perm		0.09										
v/c Ratio		0.71						0.83			0.40	
Uniform Delay, d1		37.4						6.7			3.5	
Progression Factor		1.00						0.63			0.89	
Incremental Delay, d2		14.6						5.0			1.4	
Delay (s)		51.9						9.2			4.5	
Level of Service		D						A			A	
Approach Delay (s)		51.9			0.0			9.2			4.5	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. & W 87th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	109	1044	115	59	845	151	0	500	26	0	236	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00	0.92		1.00	0.89		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1504	3210	1229	1548	3179	1215		1226	930		1061	882
Flt Permitted	0.15	1.00	1.00	0.12	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	231	3210	1229	201	3179	1215		1226	930		1061	882
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	120	1147	126	65	929	166	0	549	29	0	259	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	120	1147	126	65	929	166	0	549	29	0	259	33
Confl. Peds. (#/hr)	34		53	53		34			92			16
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	6%	3%	3%	3%	4%	8%	3%	5%	4%	3%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.6	33.6	33.6	37.2	32.4	32.4		39.6	39.6		39.6	39.6
Effective Green, g (s)	39.6	33.6	33.6	37.2	32.4	32.4		39.6	39.6		39.6	39.6
Actuated g/C Ratio	0.44	0.37	0.37	0.41	0.36	0.36		0.44	0.44		0.44	0.44
Clearance Time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	186	1198	458	154	1144	437		539	409		466	388
v/s Ratio Prot	c0.04	c0.36		0.02	0.29			c0.45			0.24	
v/s Ratio Perm	0.24		0.10	0.15		0.14			0.03			0.04
v/c Ratio	0.65	0.96	0.28	0.42	0.81	0.38		1.02	0.07		0.56	0.09
Uniform Delay, d1	17.6	27.5	19.7	19.2	26.0	21.4		25.2	14.6		18.7	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.83	0.81		0.90	0.82
Incremental Delay, d2	7.5	17.6	1.5	1.9	6.3	2.5		35.8	0.2		4.3	0.4
Delay (s)	25.1	45.1	21.2	21.1	32.4	23.9		56.7	12.0		21.2	12.3
Level of Service	C	D	C	C	C	C		E	B		C	B
Approach Delay (s)		41.2			30.5			54.5			20.2	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. & W 91st St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑	↱		↑	↱
Volume (vph)	24	27	24	26	8	53	0	611	13	0	448	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			0.95			1.00	0.95		1.00	0.97
Flpb, ped/bikes		0.99			1.00			1.00	1.00		1.00	1.00
Frt		0.96			0.92			1.00	0.85		1.00	0.85
Flt Protected		0.98			0.99			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1543			1442			1054	1404		1154	1429
Flt Permitted		0.90			0.90			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1404			1324			1054	1404		1154	1429
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.91	0.91	0.95	0.91	0.91
Adj. Flow (vph)	26	30	26	29	9	58	0	671	14	0	492	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	82	0	0	96	0	0	671	14	0	492	8
Confl. Peds. (#/hr)	16		4	4		16			9			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	4%	0%	11%	4%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		12.0			12.0			69.0	69.0		69.0	69.0
Effective Green, g (s)		12.0			12.0			69.0	69.0		69.0	69.0
Actuated g/C Ratio		0.13			0.13			0.77	0.77		0.77	0.77
Clearance Time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		8.0			8.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		187			176			808	1076		884	1095
v/s Ratio Prot								c0.64			0.43	
v/s Ratio Perm		0.06			c0.07				0.01			0.01
v/c Ratio		0.44			0.55			0.83	0.01		0.56	0.01
Uniform Delay, d1		35.9			36.5			6.7	2.5		4.3	2.5
Progression Factor		1.00			1.00			0.73	0.79		0.67	0.78
Incremental Delay, d2		6.9			10.9			7.0	0.0		2.4	0.0
Delay (s)		42.8			47.3			12.0	2.0		5.3	1.9
Level of Service		D			D			B	A		A	A
Approach Delay (s)		42.8			47.3			11.8			5.2	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1191: Ashland Ave. & W 95th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	178	579	43	62	663	226	0	579	24	0	200	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.93	1.00	0.98			1.00	0.97		1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1533	3149	1372	1497	2945			1520	1271		1520	1155
Flt Permitted	0.12	1.00	1.00	0.32	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	197	3149	1372	506	2945			1520	1271		1520	1155
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.96	0.91	0.91	0.96	0.91	0.91
Adj. Flow (vph)	196	636	47	68	729	248	0	636	26	0	220	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	196	636	47	68	977	0	0	636	26	0	220	48
Confl. Peds. (#/hr)	43		37	37		43			26			60
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	5%	0%	6%	5%	8%	2%	3%	0%	4%	3%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	38.8	32.8	32.8	36.4	31.6			39.4	39.4		39.4	39.4
Effective Green, g (s)	38.8	32.8	32.8	36.4	31.6			39.4	39.4		39.4	39.4
Actuated g/C Ratio	0.43	0.36	0.36	0.40	0.35			0.44	0.44		0.44	0.44
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	173	1147	500	257	1034			665	556		665	505
v/s Ratio Prot	c0.08	0.20		0.01	0.33			c0.42			0.14	
v/s Ratio Perm	c0.41		0.03	0.09					0.02			0.04
v/c Ratio	1.13	0.55	0.09	0.26	0.94			0.96	0.05		0.33	0.10
Uniform Delay, d1	21.1	22.8	18.8	17.0	28.4			24.5	14.5		16.6	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	108.6	1.9	0.4	0.6	17.5			25.7	0.2		1.3	0.4
Delay (s)	129.8	24.7	19.2	17.6	45.9			50.2	14.7		18.0	15.2
Level of Service	F	C	B	B	D			D	B		B	B
Approach Delay (s)		47.8			44.0			48.8			17.5	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1001: Ashland Ave. & W Irving Park Rd.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↑	↱		↑↑	↱
Volume (vph)	206	810	164	124	889	48	0	553	62	0	789	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91			1.00	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.84	1.00	0.99			1.00	0.87		1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1577	3160	1171	1544	4501			1253	890		3110	1195
Flt Permitted	0.14	1.00	1.00	0.16	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	231	3160	1171	253	4501			1253	890		3110	1195
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Adj. Flow (vph)	217	853	173	131	936	51	0	582	65	0	831	141
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	217	853	173	131	987	0	0	582	65	0	831	141
Confl. Peds. (#/hr)	72		69	69		72			81			59
Confl. Bikes (#/hr)			5			7			7			6
Heavy Vehicles (%)	1%	1%	2%	3%	0%	4%	2%	0%	3%	1%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								36	36		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	41.7	31.5	31.5	32.9	25.7			58.3	58.3		58.3	58.3
Effective Green, g (s)	41.7	31.5	31.5	32.9	25.7			58.3	58.3		58.3	58.3
Actuated g/C Ratio	0.38	0.29	0.29	0.30	0.23			0.53	0.53		0.53	0.53
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	0.2	0.2	0.2	0.2	0.2			0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	246	904	335	160	1051			664	471		1648	633
v/s Ratio Prot	c0.10	c0.27		0.05	0.22			c0.46			0.27	
v/s Ratio Perm	0.23		0.15	0.19					0.07			0.12
v/c Ratio	0.88	0.94	0.52	0.82	0.94			0.88	0.14		0.50	0.22
Uniform Delay, d1	27.0	38.4	32.9	30.9	41.4			22.7	13.1		16.6	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.24	1.31		1.00	1.00
Incremental Delay, d2	28.1	17.6	0.6	25.5	14.9			9.7	0.4		1.1	0.8
Delay (s)	55.1	55.9	33.4	56.3	56.3			37.9	17.5		17.7	14.6
Level of Service	E	E	C	E	E			D	B		B	B
Approach Delay (s)		52.7			56.3			35.8			17.2	
Approach LOS		D			E			D			B	

Intersection Summary			
HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1003: Ashland Ave. & W Grace St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	32	76	30	0	0	0	0	639	32	0	751	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.97						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1509						1158			1203	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1509						1158			1203	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.97	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	34	80	32	0	0	0	0	673	34	0	791	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	146	0	0	0	0	0	707	0	0	813	0
Confl. Peds. (#/hr)	23		20	20		23			22			11
Confl. Bikes (#/hr)			1			1			1			3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	3%	2%	5%
Parking (#/hr)								44			38	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		22.0						80.0			80.0	
Effective Green, g (s)		22.0						80.0			80.0	
Actuated g/C Ratio		0.20						0.73			0.73	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		301						842			874	
v/s Ratio Prot								0.61			c0.68	
v/s Ratio Perm		0.10										
v/c Ratio		0.49						0.84			0.93	
Uniform Delay, d1		39.0						10.5			12.6	
Progression Factor		1.00						0.81			0.82	
Incremental Delay, d2		5.5						8.4			15.9	
Delay (s)		44.5						16.9			26.2	
Level of Service		D						B			C	
Approach Delay (s)		44.5			0.0			16.9			26.2	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	119	596	69	134	493	77	0	408	40	0	633	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	9	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.98		1.00	0.95
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1508	2933		1564	2931			1189	1005		1250	1037
Flt Permitted	0.31	1.00		0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	494	2933		412	2931			1189	1005		1250	1037
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	125	627	73	141	519	81	0	429	42	0	666	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	125	700	0	141	600	0	0	429	42	0	666	49
Confl. Peds. (#/hr)	30		19	19		30			2			25
Confl. Bikes (#/hr)			2			7						
Heavy Vehicles (%)	0%	3%	0%	1%	2%	0%	8%	1%	0%	2%	3%	0%
Parking (#/hr)								42	42		32	32
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	38.3	38.3		38.3	38.3			62.7	62.7		62.7	62.7
Effective Green, g (s)	38.3	38.3		38.3	38.3			62.7	62.7		62.7	62.7
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.57	0.57		0.57	0.57
Clearance Time (s)	5.0	5.0		5.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	172	1021		143	1020			677	572		712	591
v/s Ratio Prot		0.24			0.20			0.36			c0.53	
v/s Ratio Perm	0.25			c0.34					0.04			0.05
v/c Ratio	0.73	0.69		0.99	0.59			0.63	0.07		0.94	0.08
Uniform Delay, d1	31.3	30.7		35.6	29.4			15.9	10.6		21.8	10.7
Progression Factor	1.00	1.00		1.00	1.00			0.89	0.92		0.67	0.92
Incremental Delay, d2	14.2	1.9		70.4	0.9			3.8	0.2		10.6	0.1
Delay (s)	45.5	32.6		106.0	30.3			18.0	10.0		25.2	10.0
Level of Service	D	C		F	C			B	B		C	A
Approach Delay (s)		34.6			44.7			17.3			24.1	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1007: Ashland Ave. & W Roscoe St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↑	↱		↑	↱
Volume (vph)	0	0	0	84	174	82	0	487	0	0	558	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	4.0
Lane Util. Factor					1.00			1.00			1.00	1.00
Frpb, ped/bikes					0.98			1.00			1.00	0.80
Flpb, ped/bikes					0.98			1.00			1.00	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1592			1499			1126	774
Flt Permitted					0.99			1.00			1.00	1.00
Satd. Flow (perm)					1592			1499			1126	774
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	88	183	86	0	513	0	0	587	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	357	0	0	513	0	0	587	48
Confl. Peds. (#/hr)			25	25		26			18			39
Confl. Bikes (#/hr)			1			1			6			5
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								6			48	48
Turn Type				Perm	NA			NA	Perm		NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8					2			6
Actuated Green, G (s)					32.0			70.0			70.0	70.0
Effective Green, g (s)					32.0			70.0			70.0	70.0
Actuated g/C Ratio					0.29			0.64			0.64	0.64
Clearance Time (s)					4.0			4.0			4.0	4.0
Lane Grp Cap (vph)					463			953			716	492
v/s Ratio Prot								0.34			c0.52	
v/s Ratio Perm					0.22							0.06
v/c Ratio					0.77			0.54			0.82	0.10
Uniform Delay, d1					35.7			11.1			15.2	7.8
Progression Factor					1.00			1.14			0.71	0.89
Incremental Delay, d2					11.8			1.4			5.8	0.2
Delay (s)					47.4			14.0			16.6	7.1
Level of Service					D			B			B	A
Approach Delay (s)		0.0			47.4			14.0			15.8	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	110	218	33	18	22	25	0	531	22	0	462	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.95			0.99			0.95	
Flpb, ped/bikes		0.97			0.98			1.00			1.00	
Frt		0.99			0.95			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1546			1469			1346			1432	
Flt Permitted		0.88			0.87			1.00			1.00	
Satd. Flow (perm)		1379			1303			1346			1432	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	116	229	35	19	23	26	0	559	23	0	486	55
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	380	0	0	68	0	0	582	0	0	541	0
Confl. Peds. (#/hr)	42		71	71		42			29			139
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	0%	3%	0%	0%	0%	0%	1%	0%	1%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								22			0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			62.0			62.0	
Effective Green, g (s)		40.0			40.0			62.0			62.0	
Actuated g/C Ratio		0.36			0.36			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		501			473			758			807	
v/s Ratio Prot								c0.43			0.38	
v/s Ratio Perm		c0.28			0.05							
v/c Ratio		0.76			0.14			0.77			0.67	
Uniform Delay, d1		30.8			23.5			18.5			16.8	
Progression Factor		1.00			1.00			0.55			0.47	
Incremental Delay, d2		10.3			0.6			5.0			2.5	
Delay (s)		41.1			24.1			15.2			10.3	
Level of Service		D			C			B			B	
Approach Delay (s)		41.1			24.1			15.2			10.3	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

1011: Ashland Ave. & N. Lincoln Ave. & W Belmont Ave.

	→	↘	↘	↙	←	↖	↖	↑	↗	↓	↙	↙
Movement	EBT	EBR	EBR2	WBL	WBT	WBR	WBR2	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↑↑	↱			↑↑	↱		↑	↱	↑	↱	
Volume (vph)	396	57	38	12	366	156	77	561	71	449	35	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	11	10	12	11	11	11	11	11
Total Lost time (s)	5.0	5.0			5.0	5.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	1.00			0.95	1.00		1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.89			1.00	0.81		1.00	0.73	1.00	0.89	
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.85			1.00	0.85		1.00	0.85	1.00	0.85	
Flt Protected	1.00	1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (prot)	3210	1279			3264	1076		1331	832	1506	1314	
Flt Permitted	1.00	1.00			0.93	1.00		1.00	1.00	1.00	1.00	
Satd. Flow (perm)	3210	1279			3054	1076		1331	832	1506	1314	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	417	60	40	13	385	164	81	591	75	473	37	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	417	100	0	0	398	245	0	591	75	473	41	0
Confl. Peds. (#/hr)		44		44		76			95		63	
Confl. Bikes (#/hr)		5				13			11		6	
Heavy Vehicles (%)	3%	4%	0%	0%	1%	11%	1%	2%	0%	4%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								24	24	0		
Turn Type	NA	Perm		Perm	NA	Perm		NA	Perm	NA	Perm	
Protected Phases	10				14			2		6		
Permitted Phases		10		14		14			2		6	
Actuated Green, G (s)	27.0	27.0			27.0	27.0		51.0	51.0	51.0	51.0	
Effective Green, g (s)	27.0	27.0			27.0	27.0		51.0	51.0	51.0	51.0	
Actuated g/C Ratio	0.25	0.25			0.25	0.25		0.46	0.46	0.46	0.46	
Clearance Time (s)	5.0	5.0			5.0	5.0		6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	787	313			749	264		617	385	698	609	
v/s Ratio Prot	0.13							c0.44		0.31		
v/s Ratio Perm		0.08			0.13	c0.23			0.09		0.03	
v/c Ratio	0.53	0.32			0.53	0.93		0.96	0.19	0.68	0.07	
Uniform Delay, d1	36.0	34.0			36.0	40.6		28.5	17.4	23.1	16.3	
Progression Factor	1.00	1.00			1.00	1.00		1.01	1.17	0.66	0.87	
Incremental Delay, d2	2.5	2.7			2.7	39.6		20.7	0.7	3.9	0.2	
Delay (s)	38.5	36.7			38.7	80.1		49.4	21.1	19.2	14.4	
Level of Service	D	D			D	F		D	C	B	B	
Approach Delay (s)	38.2				54.5			46.2		18.8		
Approach LOS	D				D			D		B		

Intersection Summary			
HCM 2000 Control Delay	54.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	114.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1011: Ashland Ave. & N. Lincoln Ave. & W Belmont Ave.

Movement	SEL2	SEL	SET	SER	SER2	NWL2	NWL	NWT	NWR	NWR2
Lane Configurations		↰	↑↱				↰	↑↱		
Volume (vph)	4	53	271	93	12	7	31	279	97	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	10	10	11	12	9	10	10	11
Total Lost time (s)		6.0	6.0				6.0	6.0		
Lane Util. Factor		1.00	0.95				1.00	0.95		
Frpb, ped/bikes		1.00	1.00				1.00	1.00		
Flpb, ped/bikes		1.00	1.00				1.00	1.00		
Frt		1.00	0.96				1.00	0.96		
Flt Protected		0.95	1.00				0.95	1.00		
Satd. Flow (prot)		1511	3007				1539	3047		
Flt Permitted		0.28	1.00				0.30	1.00		
Satd. Flow (perm)		451	3007				479	3047		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	56	285	98	13	7	33	294	102	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	60	396	0	0	0	40	404	0	0
Confl. Peds. (#/hr)										
Confl. Bikes (#/hr)										
Heavy Vehicles (%)	0%	2%	2%	1%	0%	0%	0%	0%	0%	25%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)										
Turn Type	Perm	Perm	NA			Perm	Perm	NA		
Protected Phases			4					8		
Permitted Phases	4	4				8	8			
Actuated Green, G (s)		15.0	15.0				15.0	15.0		
Effective Green, g (s)		15.0	15.0				15.0	15.0		
Actuated g/C Ratio		0.14	0.14				0.14	0.14		
Clearance Time (s)		6.0	6.0				6.0	6.0		
Lane Grp Cap (vph)		61	410				65	415		
v/s Ratio Prot			0.13					0.13		
v/s Ratio Perm		c0.13					0.08			
v/c Ratio		0.98	0.97				0.62	0.97		
Uniform Delay, d1		47.4	47.2				44.8	47.3		
Progression Factor		1.00	1.00				1.00	1.00		
Incremental Delay, d2		110.7	36.7				36.6	38.0		
Delay (s)		158.0	83.9				81.4	85.3		
Level of Service		F	F				F	F		
Approach Delay (s)			93.7					85.0		
Approach LOS			F					F		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑			↑↱	
Volume (vph)	0	0	0	129	306	32	0	651	0	0	732	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.98	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1907			1413			1238	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1907			1413			1238	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	136	322	34	0	685	0	0	771	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	492	0	0	685	0	0	820	0
Confl. Peds. (#/hr)			40	40		26			33			56
Confl. Bikes (#/hr)			2			2			2			3
Heavy Vehicles (%)	0%	0%	0%	3%	0%	3%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								16			30	30
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					29.0			73.0			73.0	
Effective Green, g (s)					29.0			73.0			73.0	
Actuated g/C Ratio					0.26			0.66			0.66	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					502			937			821	
v/s Ratio Prot								0.48			c0.66	
v/s Ratio Perm					0.26							
v/c Ratio					0.98			0.73			1.00	
Uniform Delay, d1					40.2			12.1			18.5	
Progression Factor					1.00			0.90			0.66	
Incremental Delay, d2					35.5			2.1			28.8	
Delay (s)					75.7			12.9			41.0	
Level of Service					E			B			D	
Approach Delay (s)		0.0			75.7			12.9			41.0	
Approach LOS		A			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1014: Ashland Ave. & W Wellington Ave.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	120	229	107	0	0	0	0	657	68	0	696	75
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.99						0.99			0.99	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.97						0.99			0.99	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1666						1373			1401	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1666						1373			1401	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.96	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	126	241	113	0	0	0	0	692	72	0	733	79
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	480	0	0	0	0	0	764	0	0	812	0
Confl. Peds. (#/hr)	27		8			27			11			22
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	2%	2%	1%	0%	0%	43%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								16	16		8	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		34.0						68.0			68.0	
Effective Green, g (s)		34.0						68.0			68.0	
Actuated g/C Ratio		0.31						0.62			0.62	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		514						848			866	
v/s Ratio Prot								0.56			c0.58	
v/s Ratio Perm		0.29										
v/c Ratio		0.93						0.90			0.94	
Uniform Delay, d1		36.9						18.1			19.1	
Progression Factor		1.00						1.58			0.54	
Incremental Delay, d2		26.3						11.8			7.2	
Delay (s)		63.2						40.3			17.5	
Level of Service		E						D			B	
Approach Delay (s)		63.2			0.0			40.3			17.5	
Approach LOS		E			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1018: Ashland Ave. & W Diversey Pkwy.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↑	↱		↑↑	↱
Volume (vph)	168	533	55	170	639	83	0	735	70	0	1014	98
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	10	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	0.91		1.00	0.79
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1577	3060		1557	3044			2357	587		2921	1143
Flt Permitted	0.19	1.00		0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	312	3060		414	3044			2357	587		2921	1143
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	177	561	58	179	673	87	0	774	74	0	1067	103
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	177	619	0	179	760	0	0	774	74	0	1067	103
Confl. Peds. (#/hr)	29		30	30		29			17			52
Confl. Bikes (#/hr)			12			7			9			8
Heavy Vehicles (%)	1%	2%	0%	2%	2%	1%	0%	1%	0%	4%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								92	92		16	
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	46.0	34.0		48.0	35.0			52.0	52.0		52.0	52.0
Effective Green, g (s)	46.0	34.0		48.0	35.0			52.0	52.0		52.0	52.0
Actuated g/C Ratio	0.42	0.31		0.44	0.32			0.47	0.47		0.47	0.47
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	268	945		315	968			1114	277		1380	540
v/s Ratio Prot	c0.07	0.20		c0.07	c0.25			0.33			c0.37	
v/s Ratio Perm	0.20			0.18					0.13			0.09
v/c Ratio	0.66	0.66		0.57	0.79			0.69	0.27		0.77	0.19
Uniform Delay, d1	22.7	32.9		20.9	34.1			22.8	17.5		24.1	16.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.77	0.86
Incremental Delay, d2	12.1	3.5		7.3	6.4			3.6	2.4		3.3	0.6
Delay (s)	34.8	36.5		28.2	40.5			26.4	19.9		21.9	15.1
Level of Service	C	D		C	D			C	B		C	B
Approach Delay (s)		36.1			38.1			25.8			21.3	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	54	211	49	96	209	31	0	676	54	0	718	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.99			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1547			1568			1206			1486	
Flt Permitted		0.84			0.68			1.00			1.00	
Satd. Flow (perm)		1308			1077			1206			1486	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	222	52	101	220	33	0	712	57	0	756	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	331	0	0	354	0	0	769	0	0	802	0
Confl. Peds. (#/hr)	9		11	11		9			8			20
Confl. Bikes (#/hr)			3						1			2
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	6%	1%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		40.0			40.0			82.0			82.0	
Effective Green, g (s)		40.0			40.0			82.0			82.0	
Actuated g/C Ratio		0.31			0.31			0.63			0.63	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		402			331			760			937	
v/s Ratio Prot								c0.64			0.54	
v/s Ratio Perm		0.25			c0.33							
v/c Ratio		0.82			1.07			1.01			0.86	
Uniform Delay, d1		41.7			45.0			24.0			19.3	
Progression Factor		1.00			1.00			0.34			1.00	
Incremental Delay, d2		17.2			69.1			23.3			9.9	
Delay (s)		58.9			114.1			31.3			29.2	
Level of Service		E			F			C			C	
Approach Delay (s)		58.9			114.1			31.3			29.2	
Approach LOS		E			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	148	648	16	96	524	28	0	730	75	0	679	170
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	9	10	9	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0		2.0	5.0	5.0		5.0	5.0		5.0	2.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93		1.00	0.93		1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1580	3144		1536	1631	1234		1516	1180		1520	1212
Flt Permitted	0.10	1.00		0.22	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	173	3144		350	1631	1234		1516	1180		1520	1212
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	156	682	17	101	552	29	0	768	79	0	715	179
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	156	699	0	101	552	29	0	768	79	0	715	179
Confl. Peds. (#/hr)	21		21	21		21			34			20
Confl. Bikes (#/hr)			9			2			6			
Heavy Vehicles (%)	1%	1%	0%	0%	3%	4%	0%	1%	1%	9%	3%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								4	4		0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	pm+ov
Protected Phases	7	4		3	8			2 10			6	7
Permitted Phases	4			8		8			2 10			6
Actuated Green, G (s)	49.8	41.8		52.2	43.0	43.0		67.0	67.0		64.0	72.0
Effective Green, g (s)	49.8	41.8		52.2	43.0	43.0		65.0	65.0		64.0	72.0
Actuated g/C Ratio	0.38	0.32		0.40	0.33	0.33		0.50	0.50		0.49	0.55
Clearance Time (s)	2.0	5.0		2.0	5.0	5.0					5.0	2.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	152	1010		224	539	408		758	590		748	671
v/s Ratio Prot	c0.06	0.22		c0.03	c0.34			c0.51			0.47	0.02
v/s Ratio Perm	0.33			0.15		0.02			0.07			0.13
v/c Ratio	1.03	0.69		0.45	1.02	0.07		1.01	0.13		0.96	0.27
Uniform Delay, d1	34.0	38.5		26.6	43.5	29.8		32.5	17.4		31.6	15.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.45	0.57		1.15	1.19
Incremental Delay, d2	80.1	3.9		1.4	45.0	0.3		19.0	0.1		16.4	0.1
Delay (s)	114.1	42.4		28.0	88.5	30.1		33.6	10.0		52.8	18.3
Level of Service	F	D		C	F	C		C	A		D	B
Approach Delay (s)		55.5			77.1			31.4			45.9	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	51.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1024: Medill Ave. & Ashland Ave. & N Clybourn Ave.

9/16/2013

	→	↘	↙	←	↖	↑	↗	↓	↙	↙	↗
Movement	**EBT**	**EBR**	**WBL2**	**WBT**	**WBR**	**NBT**	**NBR**	**SBT**	**SBR**	**SBR2**	**NEL**
Lane Configurations	↑↱			↰↑↱		↱		↱			✱
Volume (vph)	509	209	28	560	157	739	32	687	20	7	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	16
Total Lost time (s)	5.0			5.0		5.0		5.0			
Lane Util. Factor	0.95			0.95		1.00		1.00			
Frpb, ped/bikes	0.98			0.99		1.00		1.00			
Flpb, ped/bikes	1.00			1.00		1.00		1.00			
Frt	0.96			0.97		0.99		0.99			
Flt Protected	1.00			1.00		1.00		1.00			
Satd. Flow (prot)	3095			3134		1540		1449			
Flt Permitted	1.00			0.90		1.00		1.00			
Satd. Flow (perm)	3095			2817		1540		1449			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92
Adj. Flow (vph)	536	220	29	589	165	778	34	723	21	7	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	756	0	0	783	0	812	0	751	0	0	0
Confl. Peds. (#/hr)		34			11						
Heavy Vehicles (%)	0%	0%	0%	1%	2%	1%	3%	4%	0%	14%	2%
Parking (#/hr)						0		6			
Turn Type	NA		Perm	NA		NA		NA			
Protected Phases	4			8		2		6			10
Permitted Phases			8								
Actuated Green, G (s)	56.0			56.0		64.0		64.0			
Effective Green, g (s)	56.0			56.0		64.0		64.0			
Actuated g/C Ratio	0.43			0.43		0.49		0.49			
Clearance Time (s)	5.0			5.0		5.0		5.0			
Vehicle Extension (s)	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	1333			1213		758		713			
v/s Ratio Prot	0.24					c0.53		0.52			
v/s Ratio Perm				c0.28							
v/c Ratio	0.57			0.65		1.07		1.05			
Uniform Delay, d1	27.9			29.2		33.0		33.0			
Progression Factor	1.00			1.00		0.68		0.52			
Incremental Delay, d2	1.8			2.7		40.0		37.9			
Delay (s)	29.6			31.8		62.4		55.1			
Level of Service	C			C		E		E			
Approach Delay (s)	29.6			31.8		62.4		55.1			0.0
Approach LOS	C			C		E		E			A

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰↑↱			↑	↱		↑	↱
Volume (vph)	104	216	9	220	360	22	0	786	133	0	728	86
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00			1.00	0.96		1.00	0.97
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Frt		1.00	0.85		0.99			1.00	0.85		1.00	0.85
Flt Protected		0.98	1.00		0.98			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1651	1384		3092			1550	1259		1491	1413
Flt Permitted		0.52	1.00		0.63			1.00	1.00		1.00	1.00
Satd. Flow (perm)		871	1384		1970			1550	1259		1491	1413
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	109	227	9	232	379	23	0	827	140	0	766	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	336	9	0	634	0	0	827	140	0	766	91
Confl. Peds. (#/hr)	4		4	4		4			6			6
Heavy Vehicles (%)	0%	0%	0%	1%	0%	5%	0%	1%	0%	10%	5%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								0	0		0	
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		51.0	51.0		51.0			71.0	71.0		71.0	71.0
Effective Green, g (s)		51.0	51.0		51.0			71.0	71.0		71.0	71.0
Actuated g/C Ratio		0.39	0.39		0.39			0.55	0.55		0.55	0.55
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		341	542		772			846	687		814	771
v/s Ratio Prot								c0.53			0.51	
v/s Ratio Perm		c0.39	0.01		0.32				0.11			0.06
v/c Ratio		0.99	0.02		0.89dl			0.98	0.20		0.94	0.12
Uniform Delay, d1		39.1	24.2		35.4			28.7	15.1		27.5	14.3
Progression Factor		1.00	1.00		1.00			1.03	1.07		0.96	1.24
Incremental Delay, d2		45.2	0.1		9.6			23.9	0.6		9.4	0.1
Delay (s)		84.3	24.2		45.0			53.6	16.8		35.9	17.8
Level of Service		F	C		D			D	B		D	B
Approach Delay (s)		82.8			45.0			48.3			34.0	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		↑	↱		↱			↱	
Volume (vph)	20	319	70	0	518	218	0	545	1	0	695	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	9	16	16	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	3.0		4.0			3.0	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.97		1.00			1.00	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85		1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1596	1647	1336		2020	1480		1550			1515	
Flt Permitted	0.10	1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)	166	1647	1336		2020	1480		1550			1515	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	21	336	74	0	545	229	0	574	1	0	732	19
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	336	74	0	545	229	0	575	0	0	751	0
Confl. Peds. (#/hr)	8		9	9		8			3			1
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	1%	0%	5%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm		NA	custom		NA			NA	
Protected Phases		4			8	1		2			6	
Permitted Phases	4		4			8						
Actuated Green, G (s)	43.0	43.0	43.0		43.0	50.0		69.0			80.0	
Effective Green, g (s)	43.0	43.0	43.0		43.0	50.0		69.0			80.0	
Actuated g/C Ratio	0.33	0.33	0.33		0.33	0.38		0.53			0.62	
Clearance Time (s)	4.0	4.0	4.0		4.0	3.0		4.0			3.0	
Lane Grp Cap (vph)	54	544	441		668	569		822			932	
v/s Ratio Prot		0.20			c0.27	0.02		0.37			c0.50	
v/s Ratio Perm	0.13		0.06			0.13						
v/c Ratio	0.39	0.62	0.17		0.82	0.40		0.70			0.81	
Uniform Delay, d1	33.4	36.6	30.8		39.9	29.1		22.8			19.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00		0.87			0.50	
Incremental Delay, d2	19.8	5.2	0.8		10.6	2.1		3.3			3.1	
Delay (s)	53.2	41.8	31.6		50.5	31.2		23.1			12.6	
Level of Service	D	D	C		D	C		C			B	
Approach Delay (s)		40.6			44.8			23.1			12.6	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱			↰		↰	↱			↑	↱
Volume (vph)	448	287	29	5	412	0	165	271	21	0	572	229
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	10	10	16	16	16	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Lane Util. Factor	0.97	1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	0.95
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99			1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	3175	1608			1980		1637	1467			1689	1231
Flt Permitted	0.95	1.00			1.00		0.17	1.00			1.00	1.00
Satd. Flow (perm)	3175	1608			1972		295	1467			1689	1231
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	472	302	31	5	434	0	174	285	22	0	602	241
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	472	333	0	0	439	0	174	307	0	0	602	241
Confl. Peds. (#/hr)	6		5	5		6	15		12			15
Heavy Vehicles (%)	1%	3%	0%	0%	3%	0%	1%	4%	5%	11%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)								0				0
Turn Type	Prot	NA		Perm	NA		pm+pt	NA			NA	pm+ov
Protected Phases	7	4			8		5	2			6	7
Permitted Phases				8			2					6
Actuated Green, G (s)	20.9	55.3			31.4		65.7	65.7			55.9	76.8
Effective Green, g (s)	20.9	55.3			31.4		65.7	65.7			55.9	76.8
Actuated g/C Ratio	0.16	0.43			0.24		0.51	0.51			0.43	0.59
Clearance Time (s)	3.0	5.0			5.0		2.0	4.0			4.0	3.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	510	684			476		229	741			726	727
v/s Ratio Prot	c0.15	0.21					c0.05	0.21			c0.36	0.05
v/s Ratio Perm					c0.22		0.34					0.14
v/c Ratio	0.93	0.49			0.92		0.76	0.41			0.83	0.33
Uniform Delay, d1	53.8	27.1			48.1		24.0	20.1			32.8	13.5
Progression Factor	1.00	1.00			1.00		1.05	0.83			0.88	0.66
Incremental Delay, d2	22.8	0.5			23.4		9.1	1.1			7.5	0.2
Delay (s)	76.5	27.6			71.5		34.3	17.7			36.4	9.1
Level of Service	E	C			E		C	B			D	A
Approach Delay (s)		56.3			71.5			23.7			28.6	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↑	↱		↑	↱
Volume (vph)	2	185	16	113	265	9	0	489	107	0	573	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.95		1.00			1.00	0.54		1.00	0.90
Flpb, ped/bikes		1.00	1.00		0.99			1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		0.99			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1713	1451		1692			989	795		1520	1261
Flt Permitted		1.00	1.00		0.75			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1709	1451		1286			989	795		1520	1261
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	2	195	17	119	279	9	0	515	113	0	603	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	197	17	0	407	0	0	515	113	0	603	105
Confl. Peds. (#/hr)	62		8	8		62			125			24
Heavy Vehicles (%)	0%	5%	0%	5%	3%	0%	0%	2%	0%	50%	3%	5%
Parking (#/hr)								64			0	
Turn Type	Perm	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		47.0	47.0		47.0			74.0	74.0		74.0	74.0
Effective Green, g (s)		47.0	47.0		47.0			74.0	74.0		74.0	74.0
Actuated g/C Ratio		0.36	0.36		0.36			0.57	0.57		0.57	0.57
Clearance Time (s)		5.0	5.0		5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		617	524		464			562	452		865	717
v/s Ratio Prot								c0.52			0.40	
v/s Ratio Perm		0.12	0.01		c0.32				0.14			0.08
v/c Ratio		0.32	0.03		0.88			0.92	0.25		0.70	0.15
Uniform Delay, d1		30.0	26.8		38.8			25.2	14.1		20.0	13.2
Progression Factor		1.00	1.00		1.00			1.18	1.23		0.34	0.49
Incremental Delay, d2		1.4	0.1		16.8			19.6	1.1		3.6	0.3
Delay (s)		31.3	26.9		55.6			49.4	18.5		10.4	6.8
Level of Service		C	C		E			D	B		B	A
Approach Delay (s)		31.0			55.6			43.8			9.9	
Approach LOS		C			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	32	4	74	9	4	26	0	551	3	0	675	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.95			0.97			1.00			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.91			0.91			1.00			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1414			1456			1300			1473	
Flt Permitted		0.90			0.95			1.00			1.00	
Satd. Flow (perm)		1297			1396			1300			1473	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	34	4	78	9	4	27	0	580	3	0	711	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	40	0	0	583	0	0	719	0
Confl. Peds. (#/hr)	6		15	15		6						8
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	8%	3%	0%	0%	6%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			104.0			104.0	
Effective Green, g (s)		18.0			18.0			104.0			104.0	
Actuated g/C Ratio		0.14			0.14			0.80			0.80	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		179			193			1040			1178	
v/s Ratio Prot								0.45			c0.49	
v/s Ratio Perm		c0.09			0.03							
v/c Ratio		0.65			0.21			0.56			0.61	
Uniform Delay, d1		53.0			49.7			4.7			5.1	
Progression Factor		1.00			1.00			0.60			0.37	
Incremental Delay, d2		10.6			1.1			1.5			1.6	
Delay (s)		63.6			50.8			4.3			3.5	
Level of Service		E			D			A			A	
Approach Delay (s)		63.6			50.8			4.3			3.5	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1033: Ashland Ave. & W North Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↑	↱		↑	↱
Volume (vph)	101	584	57	140	558	34	0	594	143	0	718	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	9	9	9	9	9	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.94		1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1480	3900		1516	4289			1250	985		1177	886
Flt Permitted	0.20	1.00		0.17	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	314	3900		278	4289			1250	985		1177	886
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	106	615	60	147	587	36	0	625	151	0	756	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	106	675	0	147	623	0	0	625	151	0	756	31
Confl. Peds. (#/hr)			48	48					21			20
Heavy Vehicles (%)	4%	11%	4%	1%	2%	6%	2%	3%	3%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		42	42
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	30.0	23.0		30.0	23.0			89.0	89.0		89.0	89.0
Effective Green, g (s)	30.0	23.0		30.0	23.0			89.0	89.0		89.0	89.0
Actuated g/C Ratio	0.23	0.18		0.23	0.18			0.68	0.68		0.68	0.68
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	135	690		130	758			855	674		805	606
v/s Ratio Prot	0.04	0.17		c0.06	0.15			0.50			c0.64	
v/s Ratio Perm	0.14			c0.20					0.15			0.03
v/c Ratio	0.79	0.98		1.13	0.82			0.73	0.22		0.94	0.05
Uniform Delay, d1	43.1	53.3		46.5	51.5			12.9	7.6		18.1	6.7
Progression Factor	1.00	1.00		1.00	1.00			0.82	0.78		0.51	0.52
Incremental Delay, d2	25.2	29.3		118.4	9.8			4.7	0.7		17.6	0.1
Delay (s)	68.3	82.6		164.8	61.3			15.4	6.6		26.8	3.6
Level of Service	E	F		F	E			B	A		C	A
Approach Delay (s)		80.7			81.1			13.7			25.9	
Approach LOS		F			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	50.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1039: Ashland Ave. & W Blackhawk St.

9/16/2013

	↰	→	↴	↙	←	↖	↰	↑	↱	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	57	40	5	39	24	66	0	593	26	0	788	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	11	11	11	11	11	11	11	11	11
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.96			1.00			1.00	
Flpb, ped/bikes		0.98			0.97			1.00			1.00	
Frt		0.99			0.93			0.99			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1860			1456			1146			1438	
Flt Permitted		0.72			0.90			1.00			1.00	
Satd. Flow (perm)		1381			1324			1146			1438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	42	5	41	25	69	0	624	27	0	829	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	107	0	0	135	0	0	651	0	0	846	0
Confl. Peds. (#/hr)	18		38	38		18			5			47
Heavy Vehicles (%)	4%	0%	20%	5%	0%	2%	4%	1%	0%	1%	1%	0%
Parking (#/hr)								46			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			100.0			100.0	
Effective Green, g (s)		24.0			24.0			100.0			100.0	
Actuated g/C Ratio		0.18			0.18			0.77			0.77	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		254			244			881			1106	
v/s Ratio Prot								0.57			c0.59	
v/s Ratio Perm		0.08			c0.10							
v/c Ratio		0.42			0.55			0.74			0.76	
Uniform Delay, d1		46.9			48.1			8.0			8.4	
Progression Factor		1.00			1.00			0.76			0.85	
Incremental Delay, d2		5.1			8.8			5.4			2.5	
Delay (s)		51.9			56.9			11.6			9.6	
Level of Service		D			E			B			A	
Approach Delay (s)		51.9			56.9			11.6			9.6	
Approach LOS		D			E			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1042: Ashland Ave. & N Milwaukee Ave.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			↑	↱		↑↱			↑↱	
Volume (vph)	33	236	73	0	340	77	0	363	2	0	804	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	11	11	11	11	11	8	11	11	11
Total Lost time (s)	5.0	5.0			5.0	3.0		5.0			5.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.90		1.00			1.00	
Flpb, ped/bikes	0.95	1.00			1.00	1.00		1.00			1.00	
Frt	1.00	0.96			1.00	0.85		1.00			1.00	
Flt Protected	0.95	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1435	1592			1706	1312		1705			1535	
Flt Permitted	0.32	1.00			1.00	1.00		1.00			1.00	
Satd. Flow (perm)	488	1592			1706	1312		1705			1535	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.95	0.95	0.90	0.95	0.95	0.90	0.95	0.95
Adj. Flow (vph)	35	248	77	0	358	81	0	382	2	0	846	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	35	325	0	0	358	81	0	384	0	0	848	0
Confl. Peds. (#/hr)	49		18			49						5
Heavy Vehicles (%)	6%	5%	3%	0%	2%	1%	8%	2%	0%	5%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA			NA	custom		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4					3 8						
Actuated Green, G (s)	32.0	32.0			37.0	37.0		83.0			83.0	
Effective Green, g (s)	32.0	32.0			37.0	37.0		83.0			83.0	
Actuated g/C Ratio	0.25	0.25			0.28	0.28		0.64			0.64	
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)	120	391			485	373		1088			980	
v/s Ratio Prot		c0.20			c0.21			0.23			c0.55	
v/s Ratio Perm	0.07					0.06						
v/c Ratio	0.29	0.83			0.74	0.22		0.35			0.87	
Uniform Delay, d1	39.8	46.4			42.1	35.5		11.0			19.0	
Progression Factor	1.00	1.00			1.00	1.00		0.41			0.62	
Incremental Delay, d2	6.1	18.3			9.7	1.3		0.7			8.7	
Delay (s)	45.9	64.7			51.8	36.8		5.2			20.5	
Level of Service	D	E			D	D		A			C	
Approach Delay (s)		62.9			49.0			5.2			20.5	
Approach LOS		E			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	104	461	29	251	716	15	0	408	144	0	680	183
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.66	1.00	1.00	0.56		1.00	0.68		1.00	0.67
Flpb, ped/bikes	0.86	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1421	3179	978	1577	3160	806		1464	1007		1550	866
Flt Permitted	0.34	1.00	1.00	0.33	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	508	3179	978	544	3160	806		1464	1007		1550	866
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.93	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	109	485	31	264	754	16	0	429	152	0	716	193
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	109	485	31	264	754	16	0	429	152	0	716	193
Confl. Peds. (#/hr)	169		130	130		169			244			272
Confl. Bikes (#/hr)						3						5
Heavy Vehicles (%)	0%	4%	0%	1%	1%	0%	7%	1%	0%	0%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								10			0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.0	39.0	39.0	53.0	53.0	53.0		67.0	67.0		67.0	67.0
Effective Green, g (s)	39.0	39.0	39.0	53.0	53.0	53.0		67.0	67.0		67.0	67.0
Actuated g/C Ratio	0.30	0.30	0.30	0.41	0.41	0.41		0.52	0.52		0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	152	953	293	309	1288	328		754	518		798	446
v/s Ratio Prot		0.15		c0.07	0.24			0.29			c0.46	
v/s Ratio Perm	0.21		0.03	c0.28		0.02			0.15			0.22
v/c Ratio	0.72	0.51	0.11	0.85	0.59	0.05		0.57	0.29		0.90	0.43
Uniform Delay, d1	40.6	37.6	32.9	32.3	30.0	23.3		21.6	18.0		28.4	19.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.97	1.03		0.48	0.42
Incremental Delay, d2	25.1	1.9	0.7	24.8	2.0	0.3		2.6	1.2		8.0	1.5
Delay (s)	65.7	39.5	33.6	57.1	31.9	23.5		23.6	19.8		21.8	9.8
Level of Service	E	D	C	E	C	C		C	B		C	A
Approach Delay (s)		43.8			38.2			22.6			19.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1049: Ashland Ave. & W Augusta Blvd.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	120	325	58	94	523	62	0	463	130	0	743	181
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	9	10	9	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94		1.00	0.81		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1565	1723	1426	1499	1663	1288		1365	1189		1255	1395
Flt Permitted	0.17	1.00	1.00	0.39	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	283	1723	1426	610	1663	1288		1365	1189		1255	1395
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	126	342	61	99	551	65	0	487	137	0	782	191
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	126	342	61	99	551	65	0	487	137	0	782	191
Confl. Peds. (#/hr)	14		5	5		14			37			6
Heavy Vehicles (%)	2%	1%	0%	2%	1%	0%	0%	2%	1%	2%	4%	1%
Parking (#/hr)								20			30	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0		73.0	73.0		73.0	73.0
Effective Green, g (s)	51.0	51.0	51.0	51.0	51.0	51.0		73.0	73.0		73.0	73.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.56	0.56		0.56	0.56
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	111	675	559	239	652	505		766	667		704	783
v/s Ratio Prot		0.20			0.33			0.36			c0.62	
v/s Ratio Perm	c0.44		0.04	0.16		0.05			0.12			0.14
v/c Ratio	1.14	0.51	0.11	0.41	0.85	0.13		0.64	0.21		1.11	0.24
Uniform Delay, d1	39.5	30.0	25.1	28.7	35.9	25.3		19.4	14.1		28.5	14.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.71	0.87
Incremental Delay, d2	126.4	0.6	0.1	1.2	9.8	0.1		4.0	0.7		62.2	0.4
Delay (s)	165.9	30.6	25.2	29.8	45.7	25.4		23.4	14.8		82.4	13.0
Level of Service	F	C	C	C	D	C		C	B		F	B
Approach Delay (s)		62.2			41.7			21.5			68.8	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	50.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1056: Ashland Ave. & W Chicago Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	103	548	72	38	691	33	0	508	111	0	496	217
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.89		1.00	0.96
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1644	3220		1619	3247			1430	1309		1550	1414
Flt Permitted	0.22	1.00		0.29	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	383	3220		487	3247			1430	1309		1550	1414
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	108	577	76	40	727	35	0	535	117	0	522	228
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	108	653	0	40	762	0	0	535	117	0	522	228
Confl. Peds. (#/hr)	16		50	50		16			121			38
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	1%	0%	1%	1%	0%
Parking (#/hr)								14			0	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	25.9	25.9		25.9	25.9			41.1	41.1		41.1	41.1
Effective Green, g (s)	25.9	25.9		25.9	25.9			41.1	41.1		41.1	41.1
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.55	0.55		0.55	0.55
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	132	1111		168	1121			783	717		849	774
v/s Ratio Prot		0.20			0.23			c0.37			0.34	
v/s Ratio Perm	c0.28			0.08					0.09			0.16
v/c Ratio	0.82	0.59		0.24	0.68			0.68	0.16		0.61	0.29
Uniform Delay, d1	22.4	20.2		17.5	21.0			12.2	8.4		11.6	9.1
Progression Factor	1.00	1.00		1.00	1.00			0.90	0.79		1.00	1.00
Incremental Delay, d2	31.0	0.8		0.7	1.7			3.7	0.4		3.3	1.0
Delay (s)	53.4	21.0		18.2	22.7			14.7	7.0		14.9	10.1
Level of Service	D	C		B	C			B	A		B	B
Approach Delay (s)		25.6			22.4			13.3			13.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1062: Ashland Ave. & W Erie St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	53	28	25	15	55	23	0	652	7	0	649	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.97			0.97			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1528			1572			1462			1407	
Flt Permitted		0.81			0.95			1.00			1.00	
Satd. Flow (perm)		1274			1503			1462			1407	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	56	29	26	16	58	24	0	686	7	0	683	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	98	0	0	693	0	0	704	0
Confl. Peds. (#/hr)	8		16	16		8			11			8
Heavy Vehicles (%)	0%	7%	0%	7%	0%	0%	0%	1%	0%	2%	2%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		14	14
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		18.0			18.0			49.0			49.0	
Effective Green, g (s)		18.0			18.0			49.0			49.0	
Actuated g/C Ratio		0.24			0.24			0.65			0.65	
Clearance Time (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		305			360			955			919	
v/s Ratio Prot								0.47			c0.50	
v/s Ratio Perm		c0.09			0.07							
v/c Ratio		0.36			0.27			0.73			0.77	
Uniform Delay, d1		23.7			23.2			8.6			9.0	
Progression Factor		1.00			1.00			1.06			1.02	
Incremental Delay, d2		3.3			1.9			3.1			5.6	
Delay (s)		27.1			25.0			12.2			14.8	
Level of Service		C			C			B			B	
Approach Delay (s)		27.1			25.0			12.2			14.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↑	↱		↑	↱
Volume (vph)	156	584	92	82	676	104	0	531	50	0	498	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.95		1.00	0.91
Flpb, ped/bikes	1.00	1.00		0.96	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1564	3008		1533	3042			1430	1411		1535	1191
Flt Permitted	0.18	1.00		0.26	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	304	3008		420	3042			1430	1411		1535	1191
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	164	615	97	86	712	109	0	559	53	0	524	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	164	712	0	86	821	0	0	559	53	0	524	75
Confl. Peds. (#/hr)	5		69	69		5			23			56
Heavy Vehicles (%)	2%	2%	1%	0%	3%	0%	10%	1%	0%	3%	2%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								14			0	0
Turn Type	pm+pt	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	33.0	32.0		23.0	23.0			35.0	35.0		35.0	35.0
Effective Green, g (s)	33.0	32.0		23.0	23.0			35.0	35.0		35.0	35.0
Actuated g/C Ratio	0.44	0.43		0.31	0.31			0.47	0.47		0.47	0.47
Clearance Time (s)	3.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	234	1283		128	932			667	658		716	555
v/s Ratio Prot	c0.06	0.24			c0.27			c0.39			0.34	
v/s Ratio Perm	0.25			0.20					0.04			0.06
v/c Ratio	0.70	0.55		0.67	0.88			0.84	0.08		0.73	0.14
Uniform Delay, d1	25.4	16.2		22.7	24.7			17.5	11.1		16.2	11.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.67	0.86
Incremental Delay, d2	9.1	1.7		24.7	11.7			12.0	0.2		4.6	0.3
Delay (s)	34.5	17.9		47.4	36.4			29.5	11.3		15.3	10.1
Level of Service	C	B		D	D			C	B		B	B
Approach Delay (s)		21.0			37.5			27.9			14.7	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1073: Ashland Ave. & W Fulton St. (West)

9/16/2013

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↱	
Volume (vph)	53	55	0	464	742	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	3.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.97			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.93			1.00	0.99	
Flt Protected	0.98			1.00	1.00	
Satd. Flow (prot)	1458			1535	1489	
Flt Permitted	0.98			1.00	1.00	
Satd. Flow (perm)	1458			1535	1489	
Peak-hour factor, PHF	0.95	0.95	0.97	0.95	0.95	0.95
Adj. Flow (vph)	56	58	0	488	781	89
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	114	0	0	488	870	0
Confl. Peds. (#/hr)	18	3				
Heavy Vehicles (%)	2%	9%	21%	2%	4%	1%
Parking (#/hr)				0	0	
Turn Type	NA			NA	NA	
Protected Phases	4			2 10	6	
Permitted Phases						
Actuated Green, G (s)	16.0			88.0	80.0	
Effective Green, g (s)	16.0			88.0	80.0	
Actuated g/C Ratio	0.15			0.80	0.73	
Clearance Time (s)	3.0				3.0	
Lane Grp Cap (vph)	212			1228	1082	
v/s Ratio Prot	c0.08			c0.32	c0.58	
v/s Ratio Perm						
v/c Ratio	0.54			0.40	0.80	
Uniform Delay, d1	43.6			3.2	9.9	
Progression Factor	1.00			0.43	1.00	
Incremental Delay, d2	9.4			0.8	6.4	
Delay (s)	53.0			2.2	16.2	
Level of Service	D			A	B	
Approach Delay (s)	53.0			2.2	16.2	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↑
Volume (vph)	36	61	464	79	0	758
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	10	10	11	11	11	11
Total Lost time (s)	3.0		3.0			3.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.87		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		0.98			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1226		1507			1439
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	1226		1507			1439
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.99	0.95
Adj. Flow (vph)	38	64	488	83	0	798
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	102	0	571	0	0	798
Confl. Peds. (#/hr)	3	18				
Heavy Vehicles (%)	6%	7%	2%	1%	0%	4%
Parking (#/hr)			0			8
Turn Type	NA		NA			NA
Protected Phases	8		2			6 14
Permitted Phases						
Actuated Green, G (s)	16.0		80.0			88.0
Effective Green, g (s)	16.0		80.0			88.0
Actuated g/C Ratio	0.15		0.73			0.80
Clearance Time (s)	3.0		3.0			
Lane Grp Cap (vph)	178		1096			1151
v/s Ratio Prot	c0.08		0.38			c0.55
v/s Ratio Perm						
v/c Ratio	0.57		0.52			0.69
Uniform Delay, d1	43.8		6.6			4.9
Progression Factor	1.00		0.68			0.17
Incremental Delay, d2	12.7		1.2			2.1
Delay (s)	56.5		5.7			2.9
Level of Service	E		A			A
Approach Delay (s)	56.5		5.7			2.9
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↑	↱
Volume (vph)	34	274	31	32	307	89	0	491	25	0	586	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.98			0.99			1.00	0.62
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.97			0.99			1.00	0.85
Flt Protected		0.99			1.00			1.00			1.00	1.00
Satd. Flow (prot)		1721			1686			1221			1689	819
Flt Permitted		0.92			0.96			1.00			1.00	1.00
Satd. Flow (perm)		1584			1617			1221			1689	819
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.93	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	36	288	33	34	323	94	0	517	26	0	617	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	357	0	0	451	0	0	543	0	0	617	32
Confl. Peds. (#/hr)	27		52	52		27			45			88
Confl. Bikes (#/hr)			2						2			
Heavy Vehicles (%)	3%	1%	0%	0%	1%	2%	0%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								36	36			0
Turn Type	Perm	NA		Perm	NA			NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8								6
Actuated Green, G (s)		40.0			40.0			62.0			62.0	62.0
Effective Green, g (s)		40.0			40.0			62.0			62.0	62.0
Actuated g/C Ratio		0.36			0.36			0.56			0.56	0.56
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Lane Grp Cap (vph)		576			588			688			951	461
v/s Ratio Prot								c0.44			0.37	
v/s Ratio Perm		0.23			c0.28							0.04
v/c Ratio		0.62			0.77			0.79			0.65	0.07
Uniform Delay, d1		28.8			30.9			18.9			16.5	10.9
Progression Factor		1.00			1.00			0.34			0.62	0.55
Incremental Delay, d2		5.0			9.3			8.7			2.5	0.2
Delay (s)		33.7			40.1			15.1			12.6	6.2
Level of Service		C			D			B			B	A
Approach Delay (s)		33.7			40.1			15.1			12.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1079: Ashland Ave. & W Washington Blvd.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑↑			↑↱	
Volume (vph)	0	0	0	20	251	21	0	583	0	0	662	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00		0.95			0.95	
Frpb, ped/bikes				1.00	1.00	0.98		1.00			0.99	
Flpb, ped/bikes				0.99	1.00	1.00		1.00			1.00	
Frt				1.00	1.00	0.85		1.00			0.98	
Flt Protected				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)				1585	3160	1401		3079			2759	
Flt Permitted				0.95	1.00	1.00		1.00			1.00	
Satd. Flow (perm)				1585	3160	1401		3079			2759	
Peak-hour factor, PHF	0.91	0.97	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	0	0	0	21	264	22	0	614	0	0	697	104
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	21	264	22	0	614	0	0	801	0
Confl. Peds. (#/hr)			5	5		5			27			44
Confl. Bikes (#/hr)			2						1			1
Heavy Vehicles (%)	9%	0%	0%	0%	1%	0%	3%	2%	0%	0%	3%	0%
Parking (#/hr)								0			26	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)				31.0	31.0	31.0		71.0			71.0	
Effective Green, g (s)				31.0	31.0	31.0		71.0			71.0	
Actuated g/C Ratio				0.28	0.28	0.28		0.65			0.65	
Clearance Time (s)				4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)				446	890	394		1987			1780	
v/s Ratio Prot					c0.08			0.20			c0.29	
v/s Ratio Perm				0.01		0.02						
v/c Ratio				0.05	0.30	0.06		0.31			0.45	
Uniform Delay, d1				28.7	31.0	28.8		8.6			9.7	
Progression Factor				1.00	1.00	1.00		0.24			0.93	
Incremental Delay, d2				0.2	0.9	0.3		0.4			0.7	
Delay (s)				28.9	31.8	29.1		2.5			9.8	
Level of Service				C	C	C		A			A	
Approach Delay (s)		0.0			31.4			2.5			9.8	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1080: Ashland Ave. & W Warren Blvd.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱						↑↱			↑↑	
Volume (vph)	46	338	71	0	0	0	0	570	36	0	562	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0						4.0			4.0	
Lane Util. Factor		0.95						0.95			0.95	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.99			1.00	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		2953						2741			2614	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		2953						2741			2614	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.96	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	48	356	75	0	0	0	0	600	38	0	592	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	479	0	0	0	0	0	638	0	0	592	0
Confl. Peds. (#/hr)			2						19			30
Confl. Bikes (#/hr)									3			3
Heavy Vehicles (%)	0%	1%	2%	0%	0%	0%	0%	2%	0%	3%	3%	0%
Parking (#/hr)								0			18	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		43.0						59.0			59.0	
Effective Green, g (s)		43.0						59.0			59.0	
Actuated g/C Ratio		0.39						0.54			0.54	
Clearance Time (s)		4.0						4.0			4.0	
Lane Grp Cap (vph)		1154						1470			1402	
v/s Ratio Prot								c0.23			0.23	
v/s Ratio Perm		0.16										
v/c Ratio		0.42						0.43			0.42	
Uniform Delay, d1		24.4						15.4			15.3	
Progression Factor		1.00						0.58			0.85	
Incremental Delay, d2		1.1						0.8			0.9	
Delay (s)		25.5						9.8			13.8	
Level of Service		C						A			B	
Approach Delay (s)		25.5			0.0			9.8			13.8	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1082: Ashland Ave. & W Madison St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	44	614	84	14	828	208	0	485	4	0	591	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		2.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.97	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.97			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1587	2957		1548	2963			3105			3005	
Flt Permitted	0.17	1.00		0.30	1.00			1.00			1.00	
Satd. Flow (perm)	278	2957		493	2963			3105			3005	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	46	646	88	15	872	219	0	511	4	0	622	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	46	734	0	15	1091	0	0	515	0	0	668	0
Confl. Peds. (#/hr)	31		74	74		31			23			27
Confl. Bikes (#/hr)						3			1			2
Heavy Vehicles (%)	0%	5%	0%	0%	4%	0%	17%	1%	0%	5%	3%	2%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			3 8								
Actuated Green, G (s)	52.0	52.0		63.0	61.0			41.0			41.0	
Effective Green, g (s)	52.0	52.0		63.0	61.0			41.0			41.0	
Actuated g/C Ratio	0.47	0.47		0.57	0.55			0.37			0.37	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	131	1397		282	1643			1157			1120	
v/s Ratio Prot		0.25			c0.37			0.17			c0.22	
v/s Ratio Perm	0.17			0.03								
v/c Ratio	0.35	0.53		0.05	0.66			0.45			0.60	
Uniform Delay, d1	18.3	20.3		10.4	17.3			25.9			27.8	
Progression Factor	1.00	1.00		1.00	1.00			0.64			0.67	
Incremental Delay, d2	7.3	1.4		0.4	2.1			1.0			2.2	
Delay (s)	25.6	21.8		10.7	19.4			17.6			20.7	
Level of Service	C	C		B	B			B			C	
Approach Delay (s)		22.0			19.3			17.6			20.7	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1083: Ashland Ave. & W Ogden Ave.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	172	742	0	204	640	0	0	367	168	0	396	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1708	3353		1636	3241			3076			2936	
Flt Permitted	0.36	1.00		0.29	1.00			1.00			1.00	
Satd. Flow (perm)	638	3353		495	3241			3076			2936	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	181	781	0	215	674	0	0	386	177	0	417	80
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	181	781	0	215	674	0	0	563	0	0	497	0
Confl. Peds. (#/hr)	3		7	7		3			13			22
Confl. Bikes (#/hr)			1			3			3			5
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	0%	2%	0%	0%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	3	0
Parking (#/hr)									0		0	
Turn Type	Perm	NA		pm+pt	NA			NA			NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	57.0	57.0		71.0	70.0			32.0			32.0	
Effective Green, g (s)	57.0	57.0		71.0	70.0			32.0			32.0	
Actuated g/C Ratio	0.52	0.52		0.65	0.64			0.29			0.29	
Clearance Time (s)	4.0	4.0		3.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	330	1737		423	2062			894			854	
v/s Ratio Prot		0.23		c0.05	0.21			c0.18			0.17	
v/s Ratio Perm	c0.28			0.28								
v/c Ratio	0.55	0.45		0.51	0.33			0.63			0.58	
Uniform Delay, d1	17.8	16.6		18.0	9.2			33.9			33.3	
Progression Factor	1.00	1.00		1.00	1.00			0.73			0.33	
Incremental Delay, d2	6.4	0.8		4.3	0.4			3.2			2.4	
Delay (s)	24.3	17.5		22.3	9.6			28.1			13.5	
Level of Service	C	B		C	A			C			B	
Approach Delay (s)		18.8			12.7			28.1			13.5	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑↱			↑↱	
Volume (vph)	0	50	34	52	52	20	0	540	20	0	454	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.98			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.98			0.99			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1561			1572			2858			3019	
Flt Permitted		1.00			0.86			1.00			1.00	
Satd. Flow (perm)		1561			1378			2858			3019	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	53	36	55	55	21	0	568	21	0	478	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	89	0	0	131	0	0	589	0	0	479	0
Confl. Peds. (#/hr)	7		17	17		7			15			18
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	2%	5%	1%	4%	0%
Parking (#/hr)								24	24		0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		38.0			38.0			64.0			64.0	
Effective Green, g (s)		38.0			38.0			64.0			64.0	
Actuated g/C Ratio		0.35			0.35			0.58			0.58	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		539			476			1662			1756	
v/s Ratio Prot		0.06						c0.21			0.16	
v/s Ratio Perm					c0.10							
v/c Ratio		0.17			0.28			0.35			0.27	
Uniform Delay, d1		25.0			26.0			12.1			11.4	
Progression Factor		1.00			1.00			0.28			0.45	
Incremental Delay, d2		0.7			1.4			0.6			0.3	
Delay (s)		25.6			27.5			4.0			5.5	
Level of Service		C			C			A			A	
Approach Delay (s)		25.6			27.5			4.0			5.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1085: Ashland Ave. & W Adams St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↱			↑↱			↑↱	
Volume (vph)	0	0	0	68	144	83	0	506	0	0	645	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			0.95			0.95	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.96			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					2939			2642			2908	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					2939			2642			2908	
Peak-hour factor, PHF	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	72	152	87	0	533	0	0	679	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	311	0	0	533	0	0	726	0
Confl. Peds. (#/hr)			8	8		32			17			33
Confl. Bikes (#/hr)						2			1			1
Heavy Vehicles (%)	6%	0%	0%	0%	1%	1%	0%	2%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								54			12	12
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					35.0			67.0			67.0	
Effective Green, g (s)					35.0			67.0			67.0	
Actuated g/C Ratio					0.32			0.61			0.61	
Clearance Time (s)					4.0			4.0			4.0	
Lane Grp Cap (vph)					935			1609			1771	
v/s Ratio Prot								0.20			c0.25	
v/s Ratio Perm					0.11							
v/c Ratio					0.33			0.33			0.41	
Uniform Delay, d1					28.6			10.5			11.2	
Progression Factor					1.00			0.30			0.61	
Incremental Delay, d2					1.0			0.5			0.7	
Delay (s)					29.6			3.7			7.5	
Level of Service					C			A			A	
Approach Delay (s)		0.0			29.6			3.7			7.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱			↑↑	
Volume (vph)	62	228	109	0	0	0	0	638	90	0	472	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0					4.0			4.0	
Lane Util. Factor		0.95	1.00					0.95			0.95	
Frpb, ped/bikes		1.00	0.97					0.99			1.00	
Flpb, ped/bikes		1.00	1.00					1.00			1.00	
Frt		1.00	0.85					0.98			1.00	
Flt Protected		0.99	1.00					1.00			1.00	
Satd. Flow (prot)		3301	1472					3167			2889	
Flt Permitted		0.99	1.00					1.00			1.00	
Satd. Flow (perm)		3301	1472					3167			2889	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.88	0.95	0.92	0.95	0.95	0.88	0.95	0.95
Adj. Flow (vph)	65	240	115	0	0	0	0	672	95	0	497	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	305	115	0	0	0	0	767	0	0	497	0
Confl. Peds. (#/hr)	6		13			6			20			9
Heavy Vehicles (%)	0%	3%	1%	2%	0%	0%	2%	2%	1%	4%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0		20	
Turn Type	Perm	NA	Perm					NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4		4									
Actuated Green, G (s)		38.0	38.0					63.0			63.0	
Effective Green, g (s)		38.0	38.0					63.0			63.0	
Actuated g/C Ratio		0.35	0.35					0.57			0.57	
Clearance Time (s)		5.0	5.0					4.0			4.0	
Lane Grp Cap (vph)		1140	508					1813			1654	
v/s Ratio Prot								c0.24			0.17	
v/s Ratio Perm		0.09	0.08									
v/c Ratio		0.27	0.23					0.42			0.30	
Uniform Delay, d1		26.0	25.6					13.3			12.1	
Progression Factor		1.00	1.00					0.40			0.50	
Incremental Delay, d2		0.6	1.0					0.6			0.4	
Delay (s)		26.5	26.6					5.9			6.5	
Level of Service		C	C					A			A	
Approach Delay (s)		26.6			0.0			5.9			6.5	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↑	↱	↰	↰↑			↑↱	
Volume (vph)	0	0	0	292	340	185	337	522	0	0	673	129
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				0.97	1.00	1.00	0.91	0.91			0.95	
Frpb, ped/bikes				1.00	1.00	0.97	1.00	1.00			0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			0.98	
Flt Protected				0.95	1.00	1.00	0.95	0.99			1.00	
Satd. Flow (prot)				3144	1673	1396	1475	2930			2955	
Flt Permitted				0.95	1.00	1.00	0.95	0.87			1.00	
Satd. Flow (perm)				3144	1673	1396	1475	2565			2955	
Peak-hour factor, PHF	0.91	0.99	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	0	0	0	307	358	195	355	549	0	0	708	136
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	307	358	195	291	613	0	0	844	0
Confl. Peds. (#/hr)						8	15		9			15
Confl. Bikes (#/hr)						3			1			9
Heavy Vehicles (%)	7%	0%	0%	2%	4%	3%	2%	2%	0%	0%	3%	1%
Parking (#/hr)								0			0	
Turn Type				Split	NA	Perm	Prot	NA			NA	
Protected Phases				8	8		5	5 6			6 16	
Permitted Phases						8						
Actuated Green, G (s)				21.0	21.0	21.0	38.0	57.0			39.0	
Effective Green, g (s)				21.0	21.0	21.0	38.0	57.0			37.0	
Actuated g/C Ratio				0.19	0.19	0.19	0.35	0.52			0.34	
Clearance Time (s)				4.0	4.0	4.0	4.0					
Lane Grp Cap (vph)				600	319	266	509	1455			993	
v/s Ratio Prot				0.10	c0.21		c0.20	0.15			c0.29	
v/s Ratio Perm						0.14		0.07				
v/c Ratio				0.51	1.12	0.73	0.57	0.42			0.85	
Uniform Delay, d1				39.9	44.5	41.9	29.4	16.3			33.9	
Progression Factor				1.00	1.00	1.00	0.50	0.30			0.73	
Incremental Delay, d2				3.1	87.6	16.4	2.1	0.4			9.0	
Delay (s)				43.0	132.1	58.2	16.8	5.3			33.8	
Level of Service				D	F	E	B	A			C	
Approach Delay (s)		0.0			83.5			9.0			33.8	
Approach LOS		A			F			A			C	

Intersection Summary			
HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1089: Ashland Ave. & W Congress Pkwy

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑↱		↰	↑↑	
Volume (vph)	192	268	258	0	0	0	0	732	322	256	609	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor		0.95	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		3290	1471					2911		1637	3031	
Flt Permitted		0.98	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		3290	1471					2911		1637	3031	
Peak-hour factor, PHF	0.95	0.95	0.95	0.91	0.96	0.95	0.96	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	202	282	272	0	0	0	0	771	339	269	641	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	484	272	0	0	0	0	1110	0	269	641	0
Confl. Peds. (#/hr)									3	3		2
Heavy Vehicles (%)	3%	1%	4%	1%	0%	0%	0%	2%	1%	1%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Split	NA	Perm					NA		Prot	NA	
Protected Phases	4	4						2 12		1	1 2	
Permitted Phases			4									
Actuated Green, G (s)		26.0	26.0					44.0		28.0	56.0	
Effective Green, g (s)		26.0	26.0					42.0		28.0	56.0	
Actuated g/C Ratio		0.24	0.24					0.38		0.25	0.51	
Clearance Time (s)		4.0	4.0							4.0		
Lane Grp Cap (vph)		777	347					1111		416	1543	
v/s Ratio Prot		0.15						c0.38		c0.16	0.21	
v/s Ratio Perm			c0.18									
v/c Ratio		0.62	0.78					1.00		0.65	0.42	
Uniform Delay, d1		37.6	39.4					34.0		36.6	16.8	
Progression Factor		1.00	1.00					0.62		0.74	0.71	
Incremental Delay, d2		3.7	16.1					22.7		5.2	0.6	
Delay (s)		41.4	55.5					43.6		32.4	12.5	
Level of Service		D	E					D		C	B	
Approach Delay (s)		46.4			0.0			43.6			18.4	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1090: Ashland Ave. & W Harrison St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↱		↰	↑↱			↑↱			↑↱	
Volume (vph)	280	308	161	60	164	54	0	1018	84	0	689	102
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	0.91	0.91		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1488	2897		1521	2877			3041			2960	
Flt Permitted	0.50	0.92		0.44	1.00			1.00			1.00	
Satd. Flow (perm)	778	2663		705	2877			3041			2960	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	295	324	169	63	173	57	0	1072	88	0	725	107
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	248	540	0	63	230	0	0	1160	0	0	832	0
Confl. Peds. (#/hr)	29		84	84		29			36			18
Confl. Bikes (#/hr)			1			2			3			1
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	1%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	pm+pt	NA		Perm	NA			NA			NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	43.0	43.0		21.0	21.0			57.0			57.0	
Effective Green, g (s)	43.0	43.0		21.0	21.0			57.0			57.0	
Actuated g/C Ratio	0.39	0.39		0.19	0.19			0.52			0.52	
Clearance Time (s)	3.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	426	1081		134	549			1575			1533	
v/s Ratio Prot	c0.10	0.09			0.08			c0.38			0.28	
v/s Ratio Perm	c0.13	0.11		0.09								
v/c Ratio	0.58	0.50		0.47	0.42			0.74			0.54	
Uniform Delay, d1	24.6	25.4		39.6	39.1			20.6			17.8	
Progression Factor	1.00	1.00		1.00	1.00			0.69			1.25	
Incremental Delay, d2	5.7	1.6		11.4	2.3			2.8			1.2	
Delay (s)	30.3	27.0		50.9	41.5			17.0			23.5	
Level of Service	C	C		D	D			B			C	
Approach Delay (s)		28.0			43.5			17.0			23.5	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1091: Ashland Ave. & W Flourney St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱		✣			↑↱			↑↱	
Volume (vph)	360	0	91	0	0	4	0	825	4	0	723	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Util. Factor	0.97		1.00		1.00			0.95			0.95	
Frpb, ped/bikes	1.00		0.98		0.98			1.00			1.00	
Flpb, ped/bikes	0.99		1.00		1.00			1.00			1.00	
Frt	1.00		0.85		0.86			1.00			1.00	
Flt Protected	0.95		1.00		1.00			1.00			1.00	
Satd. Flow (prot)	3077		1400		1533			3046			3064	
Flt Permitted	0.76		1.00		1.00			1.00			1.00	
Satd. Flow (perm)	2446		1400		1533			3046			3064	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.91	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	379	0	96	0	0	4	0	868	4	0	761	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	379	0	96	0	4	0	0	872	0	0	781	0
Confl. Peds. (#/hr)	3		6	6		3			18			11
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Parking (#/hr)								0			0	
Turn Type	custom		custom	Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	37.0		37.0		37.0			64.0			64.0	
Effective Green, g (s)	37.0		37.0		37.0			64.0			64.0	
Actuated g/C Ratio	0.34		0.34		0.34			0.58			0.58	
Clearance Time (s)	5.0		5.0		5.0			4.0			4.0	
Lane Grp Cap (vph)	822		470		515			1772			1782	
v/s Ratio Prot					0.00			c0.29			0.25	
v/s Ratio Perm	c0.15		0.07									
v/c Ratio	0.46		0.20		0.01			0.49			0.44	
Uniform Delay, d1	28.7		26.0		24.3			13.5			12.9	
Progression Factor	1.00		1.00		1.00			0.39			0.44	
Incremental Delay, d2	1.9		1.0		0.0			0.7			0.7	
Delay (s)	30.5		27.0		24.3			6.0			6.3	
Level of Service	C		C		C			A			A	
Approach Delay (s)		29.8			24.3			6.0			6.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

1092: Ashland Ave. & W Polk St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑↱			↑↱	
Volume (vph)	220	60	99	14	16	43	0	771	11	0	785	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.94			0.94			1.00			0.99	
Flpb, ped/bikes		0.95			0.98			1.00			1.00	
Frt		0.96			0.92			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1409			1394			3044			2998	
Flt Permitted		0.78			0.92			1.00			1.00	
Satd. Flow (perm)		1136			1291			3044			2998	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	63	104	15	17	45	0	812	12	0	826	27
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	399	0	0	77	0	0	824	0	0	853	0
Confl. Peds. (#/hr)	61		136	136		61			46			41
Confl. Bikes (#/hr)			10			6			8			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	1%	2%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		58.0			58.0			44.0			44.0	
Effective Green, g (s)		58.0			58.0			44.0			44.0	
Actuated g/C Ratio		0.53			0.53			0.40			0.40	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		598			680			1217			1199	
v/s Ratio Prot								0.27			c0.28	
v/s Ratio Perm		c0.35			0.06							
v/c Ratio		0.67			0.11			0.68			0.71	
Uniform Delay, d1		19.0			13.1			27.2			27.7	
Progression Factor		1.00			1.00			0.42			0.66	
Incremental Delay, d2		5.8			0.3			2.8			3.3	
Delay (s)		24.8			13.4			14.1			21.6	
Level of Service		C			B			B			C	
Approach Delay (s)		24.8			13.4			14.1			21.6	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑↱			↑↱	
Volume (vph)	104	296	79	52	163	58	0	597	144	0	585	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00	0.75		0.96			0.92	
Flpb, ped/bikes	0.83	1.00	1.00	0.96	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1318	1631	1280	1525	1615	1044		2834			2720	
Flt Permitted	0.60	1.00	1.00	0.44	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	835	1631	1280	702	1615	1044		2834			2720	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	109	312	83	55	172	61	0	628	152	0	616	165
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	109	312	83	55	172	61	0	780	0	0	781	0
Confl. Peds. (#/hr)	152		57	57		152			40			77
Confl. Bikes (#/hr)			8			3			3			2
Heavy Vehicles (%)	0%	3%	0%	0%	4%	3%	0%	3%	0%	6%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	3	0
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	43.0	43.0	43.0	43.0	43.0	43.0		58.0			58.0	
Effective Green, g (s)	43.0	43.0	43.0	43.0	43.0	43.0		58.0			58.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39		0.53			0.53	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		5.0			5.0	
Lane Grp Cap (vph)	326	637	500	274	631	408		1494			1434	
v/s Ratio Prot		c0.19			0.11			0.28			c0.29	
v/s Ratio Perm	0.13		0.06	0.08		0.06						
v/c Ratio	0.33	0.49	0.17	0.20	0.27	0.15		0.52			0.54	
Uniform Delay, d1	23.5	25.2	21.8	22.1	22.8	21.7		17.0			17.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.22			0.90	
Incremental Delay, d2	2.7	2.7	0.7	1.6	1.1	0.8		1.0			1.1	
Delay (s)	26.2	27.9	22.5	23.8	23.9	22.4		21.7			16.6	
Level of Service	C	C	C	C	C	C		C			B	
Approach Delay (s)		26.7			23.6			21.7			16.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	136	1492	288	169	797	105	0	463	106	0	642	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.90		1.00	0.90		1.00	0.92
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1576	4354		1596	3099	1254		1550	1180		1673	1196
Flt Permitted	0.19	1.00		0.09	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	311	4354		159	3099	1254		1550	1180		1673	1196
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	143	1571	303	178	839	111	0	487	112	0	676	120
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	143	1874	0	178	839	111	0	487	112	0	676	120
Confl. Peds. (#/hr)	76		47	47		76			78			62
Confl. Bikes (#/hr)			4			3			1			6
Heavy Vehicles (%)	1%	1%	0%	0%	3%	2%	5%	1%	0%	3%	4%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			0
Turn Type	pm+pt	NA		pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	56.0	46.0		49.3	42.3	42.3		44.0	44.0		44.0	44.0
Effective Green, g (s)	56.0	46.0		49.3	42.3	42.3		44.0	44.0		44.0	44.0
Actuated g/C Ratio	0.51	0.42		0.45	0.38	0.38		0.40	0.40		0.40	0.40
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	5.0	3.0		5.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	281	1820		162	1191	482		620	472		669	478
v/s Ratio Prot	c0.05	0.43		c0.07	0.27			0.31			c0.40	
v/s Ratio Perm	0.21			c0.42		0.09			0.09			0.10
v/c Ratio	0.51	1.03		1.10	0.70	0.23		0.79	0.24		1.01	0.25
Uniform Delay, d1	17.0	32.0		25.1	28.6	22.9		28.9	21.9		33.0	22.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.72	0.82		0.76	0.61
Incremental Delay, d2	3.0	29.1		99.6	3.5	1.1		6.2	0.7		35.8	1.1
Delay (s)	20.0	61.1		124.7	32.1	24.0		27.1	18.6		60.7	14.6
Level of Service	C	E		F	C	C		C	B		E	B
Approach Delay (s)		58.2			45.9			25.5			53.8	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	50.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1096: Ashland Ave. & W 13th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	191	0	314	5	0	2	0	550	0	0	597	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.96			1.00			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1556			1654			1520			1517	
Flt Permitted		0.87			0.84			1.00			1.00	
Satd. Flow (perm)		1384			1443			1520			1517	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.91	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	201	0	331	5	0	2	0	579	0	0	628	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	532	0	0	7	0	0	579	0	0	637	0
Confl. Peds. (#/hr)	7		7	7		7			28			5
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	3%	0%	6%	0%	4%	3%	0%	0%	3%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		46.1			46.1			55.9			55.9	
Effective Green, g (s)		46.1			46.1			55.9			55.9	
Actuated g/C Ratio		0.42			0.42			0.51			0.51	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		580			604			772			770	
v/s Ratio Prot								0.38			c0.42	
v/s Ratio Perm		c0.38			0.00							
v/c Ratio		0.92			0.01			0.75			0.83	
Uniform Delay, d1		30.1			18.7			21.5			23.0	
Progression Factor		1.00			1.00			0.47			0.79	
Incremental Delay, d2		20.3			0.0			6.0			4.5	
Delay (s)		50.4			18.7			16.0			22.7	
Level of Service		D			B			B			C	
Approach Delay (s)		50.4			18.7			16.0			22.7	
Approach LOS		D			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	0	0	198	16	0	6	0	475	0	0	581	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.91			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.97			1.00			1.00	
Frt		0.86			0.96			1.00			0.99	
Flt Protected		1.00			0.96			1.00			1.00	
Satd. Flow (prot)		1399			1624			1372			1520	
Flt Permitted		1.00			0.80			1.00			1.00	
Satd. Flow (perm)		1399			1351			1372			1520	
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.91	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	0	0	208	17	0	6	0	500	0	0	612	31
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	208	0	0	23	0	0	500	0	0	643	0
Confl. Peds. (#/hr)			24	24					12			14
Confl. Bikes (#/hr)			6						5			5
Heavy Vehicles (%)	7%	0%	1%	0%	0%	0%	2%	4%	0%	4%	2%	0%
Parking (#/hr)								16			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		29.0			29.0			73.0			73.0	
Effective Green, g (s)		29.0			29.0			73.0			73.0	
Actuated g/C Ratio		0.26			0.26			0.66			0.66	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		368			356			910			1008	
v/s Ratio Prot		c0.15						0.36			c0.42	
v/s Ratio Perm					0.02							
v/c Ratio		0.57			0.06			0.55			0.64	
Uniform Delay, d1		35.0			30.3			9.8			10.8	
Progression Factor		1.00			1.00			0.80			0.66	
Incremental Delay, d2		6.2			0.3			1.9			2.0	
Delay (s)		41.2			30.7			9.8			9.0	
Level of Service		D			C			A			A	
Approach Delay (s)		41.2			30.7			9.8			9.0	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1103: Ashland Ave. & W 18th St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	102	428	160	138	390	78	0	681	125	0	522	63
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.83	1.00	1.00	0.59		1.00	0.76		1.00	0.67
Flpb, ped/bikes	0.86	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1380	1663	1185	1511	1647	811		1351	1097		1326	940
Flt Permitted	0.29	1.00	1.00	0.25	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	427	1663	1185	395	1647	811		1351	1097		1326	940
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	107	451	168	145	411	82	0	717	132	0	549	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	107	451	168	145	411	82	0	717	132	0	549	66
Confl. Peds. (#/hr)	156		59	59		156			58			79
Confl. Bikes (#/hr)			6			11						4
Heavy Vehicles (%)	0%	1%	0%	1%	2%	4%	1%	3%	2%	6%	5%	6%
Parking (#/hr)								20			20	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	39.0	39.0	39.0	39.0	39.0	39.0		60.0	60.0		60.0	60.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0		60.0	60.0		60.0	60.0
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.55	0.55		0.55	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	151	589	420	140	583	287		736	598		723	512
v/s Ratio Prot		0.27			0.25			c0.53			0.41	
v/s Ratio Perm	0.25		0.14	c0.37		0.10			0.12			0.07
v/c Ratio	0.71	0.77	0.40	1.04	0.70	0.29		0.97	0.22		0.76	0.13
Uniform Delay, d1	30.6	31.5	26.7	35.5	30.5	25.5		24.2	12.9		19.4	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.69	0.67		0.97	0.94
Incremental Delay, d2	24.4	9.2	2.8	85.9	7.0	2.5		19.8	0.5		6.7	0.5
Delay (s)	55.0	40.6	29.5	121.4	37.6	28.0		36.4	9.1		25.5	11.9
Level of Service	E	D	C	F	D	C		D	A		C	B
Approach Delay (s)		40.2			55.4			32.2			24.1	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1105: Ashland Ave. & W 19th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	46	45	15	51	75	61	0	798	26	0	670	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.95			0.99			0.99	
Flpb, ped/bikes		0.97			0.97			1.00			1.00	
Frt		0.98			0.96			1.00			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1638			1568			1382			1269	
Flt Permitted		0.71			0.88			1.00			1.00	
Satd. Flow (perm)		1185			1403			1382			1269	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	48	47	16	54	79	64	0	840	27	0	705	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	197	0	0	867	0	0	721	0
Confl. Peds. (#/hr)	44		50	50		44			66			46
Confl. Bikes (#/hr)			2			4			6			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	3%	0%	0%	6%	7%
Parking (#/hr)								14			24	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		20.0			20.0			82.0			82.0	
Effective Green, g (s)		20.0			20.0			82.0			82.0	
Actuated g/C Ratio		0.18			0.18			0.75			0.75	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		215			255			1030			945	
v/s Ratio Prot								c0.63			0.57	
v/s Ratio Perm		0.09			c0.14							
v/c Ratio		0.52			0.77			0.84			0.76	
Uniform Delay, d1		40.6			42.8			9.6			8.3	
Progression Factor		1.00			1.00			0.22			0.74	
Incremental Delay, d2		8.6			20.0			4.7			4.0	
Delay (s)		49.2			62.9			6.9			10.1	
Level of Service		D			E			A			B	
Approach Delay (s)		49.2			62.9			6.9			10.1	
Approach LOS		D			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	39	78	27	148	99	30	0	725	51	0	646	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.97			0.99			0.99			1.00	
Flt Protected		0.99			0.97			1.00			1.00	
Satd. Flow (prot)		1700			1670			1331			1371	
Flt Permitted		0.86			0.70			1.00			1.00	
Satd. Flow (perm)		1477			1197			1331			1371	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	82	28	156	104	32	0	763	54	0	680	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	151	0	0	292	0	0	817	0	0	702	0
Confl. Peds. (#/hr)	33		17	17		33			18			20
Confl. Bikes (#/hr)			1			1			1			1
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	0%	3%	2%	2%	6%	0%
Parking (#/hr)								20			12	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.6			28.6			73.4			73.4	
Effective Green, g (s)		28.6			28.6			73.4			73.4	
Actuated g/C Ratio		0.26			0.26			0.67			0.67	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		384			311			888			914	
v/s Ratio Prot								c0.61			0.51	
v/s Ratio Perm		0.10			c0.24							
v/c Ratio		0.39			0.94			0.92			0.77	
Uniform Delay, d1		33.5			39.8			15.8			12.5	
Progression Factor		1.00			1.00			0.74			0.98	
Incremental Delay, d2		1.4			35.9			12.7			4.0	
Delay (s)		34.9			75.7			24.3			16.2	
Level of Service		C			E			C			B	
Approach Delay (s)		34.9			75.7			24.3			16.2	
Approach LOS		C			E			C			B	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1109: S Blue Island Ave. & Ashland Ave. & W Cermak Rd.

Movement	EBL	EBT	EBR	WBL2	WBL	WBT	WBR	NBT	NBR	SBT	SBR	SBR2
Lane Configurations	↰	↑↱			↰	↑↱		↑↱		↑	↱	
Volume (vph)	81	301	87	84	172	451	45	620	97	555	104	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	12	11	10	11	12	11	11	11	11	11
Total Lost time (s)	4.0	4.0			3.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95			1.00	0.95		0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99			1.00	0.98		1.00		1.00	0.86	
Flpb, ped/bikes	0.89	1.00			1.00	1.00		1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.99		0.98		1.00	0.85	
Flt Protected	0.95	1.00			0.95	1.00		1.00		1.00	1.00	
Satd. Flow (prot)	1413	3045			1451	3066		2383		1442	1069	
Flt Permitted	0.46	1.00			0.26	1.00		1.00		1.00	1.00	
Satd. Flow (perm)	682	3045			398	3066		2383		1442	1069	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	317	92	88	181	475	47	653	102	584	109	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	85	409	0	0	269	522	0	755	0	584	142	0
Confl. Peds. (#/hr)	99						99		6		53	
Confl. Bikes (#/hr)			2				6		6		1	
Heavy Vehicles (%)	0%	5%	2%	10%	10%	4%	3%	3%	8%	5%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	3	0
Parking (#/hr)								74	74	6	6	
Turn Type	Perm	NA		pm+pt	pm+pt	NA		NA		NA	Perm	
Protected Phases		4		3	3	8		2		6		
Permitted Phases	4			8	8						6	
Actuated Green, G (s)	19.9	19.9			37.4	37.4		48.5		48.5	48.5	
Effective Green, g (s)	19.9	19.9			37.4	37.4		48.5		48.5	48.5	
Actuated g/C Ratio	0.18	0.18			0.34	0.34		0.44		0.44	0.44	
Clearance Time (s)	4.0	4.0			3.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	123	550			274	1042		1050		635	471	
v/s Ratio Prot		0.13			c0.13	0.17		0.32		c0.41		
v/s Ratio Perm	0.12				c0.20						0.13	
v/c Ratio	0.69	0.74			0.98	0.50		0.72		0.92	0.30	
Uniform Delay, d1	42.2	42.6			31.8	28.9		25.2		28.9	19.8	
Progression Factor	1.00	1.00			1.00	1.00		0.97		0.90	0.98	
Incremental Delay, d2	15.4	5.4			49.1	0.4		3.7		15.0	1.1	
Delay (s)	57.6	48.0			80.8	29.3		28.2		41.0	20.5	
Level of Service	E	D			F	C		C		D	C	
Approach Delay (s)		49.7				46.8		28.2		37.0		
Approach LOS		D				D		C		D		

Intersection Summary			
HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

1109: S Blue Island Ave. & Ashland Ave. & W Cermak Rd.

Movement	NEL2	NEL	NER	NER2
Lane Configurations				
Volume (vph)	4	97	159	47
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	11	11	12	12
Total Lost time (s)		4.0	4.0	
Lane Util. Factor		1.00	0.88	
Frpb, ped/bikes		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.85	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		1637	2507	
Flt Permitted		0.99	1.00	
Satd. Flow (perm)		1703	2507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	102	167	49
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	0	106	216	0
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Heavy Vehicles (%)	0%	1%	9%	2%
Bus Blockages (#/hr)	0	0	0	0
Parking (#/hr)				
Turn Type	Perm	NA	Prot	
Protected Phases		9	9	
Permitted Phases	9			
Actuated Green, G (s)		12.1	12.1	
Effective Green, g (s)		12.1	12.1	
Actuated g/C Ratio		0.11	0.11	
Clearance Time (s)		4.0	4.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		187	275	
v/s Ratio Prot			c0.09	
v/s Ratio Perm		0.06		
v/c Ratio		0.57	0.79	
Uniform Delay, d1		46.5	47.7	
Progression Factor		1.00	1.00	
Incremental Delay, d2		3.9	13.7	
Delay (s)		50.4	61.4	
Level of Service		D	E	
Approach Delay (s)		57.7		
Approach LOS		E		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1110: Ashland Ave. & 2451 S Ashland Ave.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	2	0	4	0	0	1	0	799	0	0	778	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.94			0.97			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.91			0.86			1.00			1.00	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1507			1507			1657			1722	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1532			1507			1657			1722	
Peak-hour factor, PHF	0.95	0.94	0.95	0.95	0.94	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	2	0	4	0	0	1	0	841	0	0	819	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	6	0	0	1	0	0	841	0	0	820	0
Confl. Peds. (#/hr)	1		2	2		1			1			12
Confl. Bikes (#/hr)									2			4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	14%	5%	0%	25%	1%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		1.6			1.6			98.4			98.4	
Effective Green, g (s)		1.6			1.6			98.4			98.4	
Actuated g/C Ratio		0.01			0.01			0.89			0.89	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		22			21			1482			1540	
v/s Ratio Prot					0.00			c0.51			0.48	
v/s Ratio Perm		c0.00										
v/c Ratio		0.27			0.05			0.57			0.53	
Uniform Delay, d1		53.6			53.4			1.2			1.2	
Progression Factor		1.00			1.00			1.00			0.40	
Incremental Delay, d2		13.6			2.0			1.6			0.6	
Delay (s)		67.2			55.4			2.8			1.1	
Level of Service		E			E			A			A	
Approach Delay (s)		67.2			55.4			2.8			1.1	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1111: Ashland Ave. & W 27th St.

9/16/2013

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↑	↱
Volume (vph)	0	0	0	785	778	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)				5.0	5.0	
Lane Util. Factor				1.00	1.00	
Frpb, ped/bikes				1.00	1.00	
Flpb, ped/bikes				1.00	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				1689	1689	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				1689	1689	
Peak-hour factor, PHF	0.95	0.95	0.96	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	826	819	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	826	819	0
Confl. Peds. (#/hr)		10				16
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	0%	0%	50%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	3
Turn Type		Perm		NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4				6
Actuated Green, G (s)				100.0	100.0	
Effective Green, g (s)				100.0	100.0	
Actuated g/C Ratio				1.00	1.00	
Clearance Time (s)				5.0	5.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				1689	1689	
v/s Ratio Prot				c0.49	0.48	
v/s Ratio Perm						
v/c Ratio				0.49	0.48	
Uniform Delay, d1				0.0	0.0	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.8	1.0	
Delay (s)				0.8	1.0	
Level of Service				A	A	
Approach Delay (s)	0.0			0.8	1.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	0.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1112: Ashland Ave. & W Marketplace Access Rd.

9/16/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↑	↳	
Volume (vph)	8	18	0	692	706	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	11	11	11	11
Total Lost time (s)	4.0	4.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1710	1255		1171	1187	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1710	1255		1171	1187	
Peak-hour factor, PHF	0.95	0.95	0.92	0.95	0.95	0.95
Adj. Flow (vph)	8	19	0	728	743	5
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	8	19	0	728	748	0
Confl. Peds. (#/hr)		2				3
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	17%	29%	4%	4%	0%
Parking (#/hr)				40	38	
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	4.9	4.9		86.1	86.1	
Effective Green, g (s)	4.9	4.9		86.1	86.1	
Actuated g/C Ratio	0.05	0.05		0.86	0.86	
Clearance Time (s)	4.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	83	61		1008	1022	
v/s Ratio Prot	0.00			0.62	c0.63	
v/s Ratio Perm		c0.02				
v/c Ratio	0.10	0.31		0.72	0.73	
Uniform Delay, d1	45.4	45.9		2.6	2.6	
Progression Factor	1.00	1.00		1.04	1.00	
Incremental Delay, d2	0.5	2.9		3.9	4.1	
Delay (s)	45.9	48.8		6.5	6.7	
Level of Service	D	D		A	A	
Approach Delay (s)	48.0			6.5	6.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1113: Ashland Ave. & W 31st Pl.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱		✥			↱		↰	↑	↱
Volume (vph)	292	0	158	22	0	13	0	313	11	0	638	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0			12.0			12.0	12.0
Lane Util. Factor	1.00		1.00		1.00			1.00			1.00	1.00
Frpb, ped/bikes	1.00		1.00		0.98			1.00			1.00	0.97
Flpb, ped/bikes	1.00		1.00		1.00			1.00			1.00	1.00
Frt	1.00		0.85		0.95			1.00			1.00	0.85
Flt Protected	0.95		1.00		0.97			1.00			1.00	1.00
Satd. Flow (prot)	1605		1232		1122			1639			1689	1371
Flt Permitted	0.95		1.00		0.97			1.00			1.00	1.00
Satd. Flow (perm)	1605		1232		1122			1639			1689	1371
Peak-hour factor, PHF	0.95	0.96	0.95	0.95	0.96	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	307	0	166	23	0	14	0	329	12	0	672	168
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	307	0	166	0	37	0	0	341	0	0	672	168
Confl. Peds. (#/hr)	2					2			70			3
Confl. Bikes (#/hr)									2			2
Heavy Vehicles (%)	3%	0%	20%	45%	0%	46%	0%	4%	36%	82%	3%	5%
Turn Type	Split		Perm	Split	NA			NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases			4							6		6
Actuated Green, G (s)	24.0		24.0		4.8			51.2			51.2	51.2
Effective Green, g (s)	24.0		24.0		4.8			51.2			51.2	51.2
Actuated g/C Ratio	0.24		0.24		0.05			0.51			0.51	0.51
Clearance Time (s)	4.0		4.0		4.0			12.0			12.0	12.0
Vehicle Extension (s)	3.0		3.0		3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	385		295		53			839			864	701
v/s Ratio Prot	c0.19				c0.03			0.21			c0.40	
v/s Ratio Perm			0.13									0.12
v/c Ratio	0.80		0.56		0.70			0.41			0.78	0.24
Uniform Delay, d1	35.7		33.4		46.9			15.0			19.8	13.6
Progression Factor	1.00		1.00		1.00			0.76			0.89	0.85
Incremental Delay, d2	15.7		7.6		33.1			1.1			5.4	0.6
Delay (s)	51.4		41.0		80.0			12.6			23.0	12.2
Level of Service	D		D		E			B			C	B
Approach Delay (s)		47.7			80.0			12.6			20.9	
Approach LOS		D			E			B			C	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1114: Ashland Ave. & S Archer Ave.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↱			↱	
Volume (vph)	100	1049	115	178	991	47	0	301	99	0	454	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	10	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1651	4525		1635	4404			1406			1567	
Flt Permitted	0.18	1.00		0.11	1.00			1.00			1.00	
Satd. Flow (perm)	319	4525		183	4404			1406			1567	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	105	1104	121	187	1043	49	0	317	104	0	478	104
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	105	1225	0	187	1092	0	0	421	0	0	582	0
Confl. Peds. (#/hr)	24		69	69		24			65			25
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	0%	2%	4%	1%	3%	7%	100%	7%	3%	7%	9%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0			18
Turn Type	pm+pt	NA		pm+pt	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	41.1	34.7		47.6	38.2			42.4			42.4	
Effective Green, g (s)	41.1	34.7		47.6	38.2			42.4			42.4	
Actuated g/C Ratio	0.41	0.35		0.48	0.38			0.42			0.42	
Clearance Time (s)	3.0	5.0		3.0	5.0			5.0			5.0	
Vehicle Extension (s)	5.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	216	1570		230	1682			596			664	
v/s Ratio Prot	0.03	0.27		c0.08	0.25			0.30			c0.37	
v/s Ratio Perm	0.17			c0.31								
v/c Ratio	0.49	0.78		0.81	0.65			0.71			0.88	
Uniform Delay, d1	19.1	29.2		19.8	25.4			23.7			26.4	
Progression Factor	1.00	1.00		1.00	1.00			0.89			0.66	
Incremental Delay, d2	3.6	2.6		19.3	2.0			6.7			11.1	
Delay (s)	22.6	31.8		39.1	27.4			27.8			28.6	
Level of Service	C	C		D	C			C			C	
Approach Delay (s)		31.1			29.1			27.8			28.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↲	↱	↰	↑			↳	
Volume (vph)	0	0	0	116	63	8	166	343	27	0	476	81
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	14	12	12	11	12	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	2.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	
Frpb, ped/bikes					1.00	0.96	1.00	0.99			0.99	
Flpb, ped/bikes					0.98	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	0.99			0.98	
Flt Protected					0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1630	1472	1496	1608			1571	
Flt Permitted					0.97	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1630	1472	559	1608			1571	
Peak-hour factor, PHF	0.95	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	122	66	8	175	361	28	0	501	85
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	188	8	175	389	0	0	586	0
Confl. Peds. (#/hr)	6		10	10		6	22		14			22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%	10%	7%	0%	3%	8%	5%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					16.3	16.3	77.7	75.7			63.7	
Effective Green, g (s)					16.3	16.3	77.7	75.7			63.7	
Actuated g/C Ratio					0.16	0.16	0.78	0.76			0.64	
Clearance Time (s)					4.0	4.0	2.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					265	239	528	1217			1000	
v/s Ratio Prot							c0.03	0.24			c0.37	
v/s Ratio Perm					0.12	0.01	0.22					
v/c Ratio					0.71	0.03	0.33	0.32			0.59	
Uniform Delay, d1					39.6	35.2	8.6	3.9			10.5	
Progression Factor					1.00	1.00	0.43	0.43			0.54	
Incremental Delay, d2					8.4	0.1	0.3	0.6			1.3	
Delay (s)					48.0	35.3	4.0	2.3			7.0	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			47.5			2.8			7.0	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1118: Ashland Ave. & W 33rd St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			↑			↑	
Volume (vph)	16	41	44	0	0	39	0	462	10	0	488	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99			0.97			1.00			1.00	
Flpb, ped/bikes	0.99	1.00			1.00			1.00			1.00	
Frt	1.00	0.92			0.86			1.00			1.00	
Flt Protected	0.95	1.00			1.00			1.00			1.00	
Satd. Flow (prot)	1694	1606			1396			1064			1431	
Flt Permitted	0.73	1.00			1.00			1.00			1.00	
Satd. Flow (perm)	1302	1606			1396			1064			1431	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.95	0.92	0.95	0.95	0.93	0.95	0.95
Adj. Flow (vph)	17	43	46	0	0	41	0	486	11	0	514	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	89	0	0	41	0	0	497	0	0	515	0
Confl. Peds. (#/hr)	4		2			4			5			7
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	0%	0%	4%	2%	2%	8%	2%	6%	0%	14%	7%	0%
Parking (#/hr)								50			4	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)	20.0	20.0			20.0			72.0			72.0	
Effective Green, g (s)	20.0	20.0			20.0			72.0			72.0	
Actuated g/C Ratio	0.20	0.20			0.20			0.72			0.72	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	260	321			279			766			1030	
v/s Ratio Prot		c0.06			0.03			c0.47			0.36	
v/s Ratio Perm	0.01											
v/c Ratio	0.07	0.28			0.15			0.65			0.50	
Uniform Delay, d1	32.4	33.9			33.0			7.4			6.1	
Progression Factor	1.00	1.00			1.00			0.85			0.63	
Incremental Delay, d2	0.5	2.1			1.1			3.3			1.4	
Delay (s)	32.9	36.0			34.1			9.6			5.3	
Level of Service	C	D			C			A			A	
Approach Delay (s)		35.5			34.1			9.6			5.3	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱	↱		↑	↱		↑	↱
Volume (vph)	60	320	93	74	310	108	0	538	36	0	443	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.94		1.00	0.92
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1532	1570	1238	1515	1538	1220		1192	959		1193	984
Flt Permitted	0.33	1.00	1.00	0.35	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	526	1570	1238	560	1538	1220		1192	959		1193	984
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	63	337	98	78	326	114	0	566	38	0	466	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	63	337	98	78	337	103	0	566	38	0	466	38
Confl. Peds. (#/hr)	11		12	12		11			12			17
Confl. Bikes (#/hr)						2			1			
Heavy Vehicles (%)	3%	7%	10%	4%	3%	6%	14%	8%	6%	17%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)								32	32		36	36
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	30.0	30.0	30.0	30.0	30.0	30.0		61.0	61.0		61.0	61.0
Effective Green, g (s)	30.0	30.0	30.0	30.0	30.0	30.0		61.0	61.0		61.0	61.0
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30		0.61	0.61		0.61	0.61
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	157	471	371	168	461	366		727	584		727	600
v/s Ratio Prot		0.21			c0.22			c0.47			0.39	
v/s Ratio Perm	0.12		0.08	0.14		0.08			0.04			0.04
v/c Ratio	0.40	0.72	0.26	0.46	0.73	0.28		0.78	0.07		0.64	0.06
Uniform Delay, d1	27.9	31.2	26.6	28.5	31.4	26.8		14.5	7.9		12.5	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.67	0.88		0.71	0.69
Incremental Delay, d2	7.5	9.0	1.7	9.0	9.8	1.9		7.3	0.2		3.9	0.2
Delay (s)	35.3	40.2	28.3	37.4	41.2	28.7		17.0	7.2		12.7	5.6
Level of Service	D	D	C	D	D	C		B	A		B	A
Approach Delay (s)		37.2			38.1			16.4			12.2	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	24	4	15	12	16	19	0	554	16	0	476	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.95			0.95			1.00			1.00	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1650			1583			1461			1488	
Flt Permitted		0.87			0.92			1.00			1.00	
Satd. Flow (perm)		1478			1469			1461			1488	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	4	16	13	17	20	0	583	17	0	501	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	50	0	0	600	0	0	510	0
Confl. Peds. (#/hr)	4					4						1
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	11%	5%	7%	0%	19%	5%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		8.9			8.9			82.1			82.1	
Effective Green, g (s)		8.9			8.9			82.1			82.1	
Actuated g/C Ratio		0.09			0.09			0.82			0.82	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		131			130			1199			1221	
v/s Ratio Prot								c0.41			0.34	
v/s Ratio Perm		0.03			c0.03							
v/c Ratio		0.34			0.38			0.50			0.42	
Uniform Delay, d1		42.8			43.0			2.7			2.4	
Progression Factor		1.00			1.00			0.78			0.76	
Incremental Delay, d2		3.3			3.9			1.4			0.9	
Delay (s)		46.1			46.9			3.6			2.7	
Level of Service		D			D			A			A	
Approach Delay (s)		46.1			46.9			3.6			2.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1127: Ashland Ave. & W Pershing Rd.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	15	217	146	166	501	123	0	432	45	0	494	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1653	3033	1394	1585	3119	1321		1398	1143		1374	1291
Flt Permitted	0.43	1.00	1.00	0.48	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	747	3033	1394	805	3119	1321		1398	1143		1374	1291
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	16	228	154	175	527	129	0	455	47	0	520	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	228	154	175	527	129	0	455	47	0	520	33
Confl. Peds. (#/hr)			3	3					4			4
Heavy Vehicles (%)	0%	9%	3%	4%	6%	12%	1%	12%	13%	16%	14%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	25.7	23.3	23.3	36.8	31.4	31.4		57.2	57.2		57.2	57.2
Effective Green, g (s)	25.7	23.3	23.3	36.8	31.4	31.4		57.2	57.2		57.2	57.2
Actuated g/C Ratio	0.26	0.23	0.23	0.37	0.31	0.31		0.57	0.57		0.57	0.57
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	213	706	324	378	979	414		799	653		785	738
v/s Ratio Prot	0.00	0.08		c0.05	c0.17			0.33			c0.38	
v/s Ratio Perm	0.02		0.11	0.12		0.10			0.04			0.03
v/c Ratio	0.08	0.32	0.48	0.46	0.54	0.31		0.57	0.07		0.66	0.04
Uniform Delay, d1	27.9	31.8	33.1	22.6	28.3	26.1		13.6	9.6		14.7	9.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.77	0.67
Incremental Delay, d2	0.2	1.2	4.9	0.9	2.1	2.0		2.9	0.2		2.0	0.0
Delay (s)	28.0	33.0	38.0	23.5	30.4	28.0		16.5	9.8		13.3	6.4
Level of Service	C	C	D	C	C	C		B	A		B	A
Approach Delay (s)		34.7			28.6			15.9			12.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

1130: Ashland Ave. & W 42nd St. (West)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↳	
Volume (vph)	37	20	0	378	606	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	12	11	11	11	11
Total Lost time (s)	5.0			3.0	3.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.95			1.00	0.99	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1565			1187	1644	
Flt Permitted	0.97			1.00	1.00	
Satd. Flow (perm)	1565			1187	1644	
Peak-hour factor, PHF	0.95	0.95	0.96	0.95	0.95	0.95
Adj. Flow (vph)	39	21	0	398	638	56
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	60	0	0	398	694	0
Confl. Peds. (#/hr)	4	1				6
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	0%	5%	0%	7%	4%	9%
Parking (#/hr)				34		
Turn Type	NA			NA	NA	
Protected Phases	4			2 9	6	
Permitted Phases						
Actuated Green, G (s)	11.2			68.8	61.8	
Effective Green, g (s)	11.2			68.8	61.8	
Actuated g/C Ratio	0.12			0.76	0.69	
Clearance Time (s)	5.0				3.0	
Vehicle Extension (s)	8.0				3.0	
Lane Grp Cap (vph)	194			907	1128	
v/s Ratio Prot	c0.04			c0.34	c0.42	
v/s Ratio Perm						
v/c Ratio	0.31			0.44	0.62	
Uniform Delay, d1	35.9			3.8	7.6	
Progression Factor	1.00			0.30	1.00	
Incremental Delay, d2	3.9			0.3	2.5	
Delay (s)	39.7			1.5	10.2	
Level of Service	D			A	B	
Approach Delay (s)	39.7			1.5	10.2	
Approach LOS	D			A	B	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑			↱	
Volume (vph)	0	0	22	0	0	5	0	361	1	0	380	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	8	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.86			0.86			1.00			1.00	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1557			1038			1491			1491	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1557			1038			1491			1491	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.95	0.92	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	0	0	23	0	0	5	0	380	1	0	400	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	23	0	0	5	0	0	381	0	0	402	0
Confl. Peds. (#/hr)												4
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	0%	0%	2%	50%	2%	5%	0%	67%	5%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6 13	
Permitted Phases	4			8								
Actuated Green, G (s)		11.2			11.2			61.8			68.8	
Effective Green, g (s)		11.2			11.2			61.8			68.8	
Actuated g/C Ratio		0.12			0.12			0.69			0.76	
Clearance Time (s)		5.0			5.0			3.0				
Vehicle Extension (s)		8.0			8.0			3.0				
Lane Grp Cap (vph)		193			129			1023			1139	
v/s Ratio Prot		c0.01			0.00			c0.26			c0.27	
v/s Ratio Perm												
v/c Ratio		0.12			0.04			0.37			0.35	
Uniform Delay, d1		35.0			34.7			5.9			3.4	
Progression Factor		1.00			1.00			0.52			0.09	
Incremental Delay, d2		1.2			0.5			1.0			0.2	
Delay (s)		36.2			35.2			4.1			0.5	
Level of Service		D			D			A			A	
Approach Delay (s)		36.2			35.2			4.1			0.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1132: Ashland Ave. & W 43rd St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱		↑	↱		↑	↱
Volume (vph)	78	190	86	48	320	182	0	259	16	0	392	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97		1.00	0.97		1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1590	1515		1510	1600	1252		1259	1014		1221	979
Flt Permitted	0.41	1.00		0.47	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	690	1515		746	1600	1252		1259	1014		1221	979
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	82	200	91	51	337	192	0	273	17	0	413	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	82	291	0	51	337	192	0	273	17	0	413	67
Confl. Peds. (#/hr)	4		15	15		4			4			12
Confl. Bikes (#/hr)			2						2			2
Heavy Vehicles (%)	0%	5%	2%	4%	5%	11%	3%	5%	6%	22%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								28	28		34	34
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	32.0	32.0		32.0	32.0	32.0		49.0	49.0		49.0	49.0
Effective Green, g (s)	32.0	32.0		32.0	32.0	32.0		49.0	49.0		49.0	49.0
Actuated g/C Ratio	0.36	0.36		0.36	0.36	0.36		0.54	0.54		0.54	0.54
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	245	538		265	568	445		685	552		664	533
v/s Ratio Prot		0.19			c0.21			0.22			c0.34	
v/s Ratio Perm	0.12			0.07		0.15			0.02			0.07
v/c Ratio	0.33	0.54		0.19	0.59	0.43		0.40	0.03		0.62	0.13
Uniform Delay, d1	21.2	23.1		20.1	23.7	22.1		11.9	9.5		14.1	10.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		0.86	1.01		0.62	0.43
Incremental Delay, d2	3.7	3.9		1.6	4.5	3.0		1.7	0.1		4.2	0.5
Delay (s)	24.9	27.0		21.7	28.2	25.1		12.0	9.7		13.0	4.8
Level of Service	C	C		C	C	C		B	A		B	A
Approach Delay (s)		26.5			26.6			11.9			11.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1133: Ashland Ave. & W 44th St.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	12	7	22	28	34	20	0	279	28	0	411	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			1.00			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.93			0.97			0.99			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1601			1621			1337			1131	
Flt Permitted		0.92			0.87			1.00			1.00	
Satd. Flow (perm)		1491			1435			1337			1131	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	7	23	29	36	21	0	294	29	0	433	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	43	0	0	86	0	0	323	0	0	475	0
Confl. Peds. (#/hr)	7		3	3		7			11			23
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	0%	0%	0%	7%	0%	6%	14%	5%	4%	10%	4%	5%
Parking (#/hr)								16			42	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		9.8			9.8			71.2			71.2	
Effective Green, g (s)		9.8			9.8			71.2			71.2	
Actuated g/C Ratio		0.11			0.11			0.79			0.79	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Vehicle Extension (s)		5.0			5.0			3.0			3.0	
Lane Grp Cap (vph)		162			156			1057			894	
v/s Ratio Prot								0.24			c0.42	
v/s Ratio Perm		0.03			c0.06							
v/c Ratio		0.27			0.55			0.31			0.53	
Uniform Delay, d1		36.8			38.0			2.6			3.4	
Progression Factor		1.00			1.00			0.80			0.87	
Incremental Delay, d2		1.8			7.0			0.7			1.9	
Delay (s)		38.6			45.0			2.8			4.8	
Level of Service		D			D			A			A	
Approach Delay (s)		38.6			45.0			2.8			4.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	28	30	9	18	8	36	0	265	19	0	413	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			1.00			1.00	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.98			0.92			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1711			1586			1148			1167	
Flt Permitted		0.88			0.92			1.00			1.00	
Satd. Flow (perm)		1539			1483			1148			1167	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	29	32	9	19	8	38	0	279	20	0	435	36
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	65	0	0	299	0	0	471	0
Confl. Peds. (#/hr)	11		9	9		11			12			6
Confl. Bikes (#/hr)						1			2			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	5%	0%	0%	3%	3%
Parking (#/hr)								40			40	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		23.0			23.0			58.0			58.0	
Effective Green, g (s)		23.0			23.0			58.0			58.0	
Actuated g/C Ratio		0.26			0.26			0.64			0.64	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		393			378			739			752	
v/s Ratio Prot								0.26			c0.40	
v/s Ratio Perm		c0.05			0.04							
v/c Ratio		0.18			0.17			0.40			0.63	
Uniform Delay, d1		26.1			26.1			7.7			9.5	
Progression Factor		1.00			1.00			0.62			0.45	
Incremental Delay, d2		1.0			1.0			1.6			3.5	
Delay (s)		27.1			27.1			6.3			7.7	
Level of Service		C			C			A			A	
Approach Delay (s)		27.1			27.1			6.3			7.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1135: Ashland Ave. & W 46th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	36	78	49	12	33	51	0	234	45	0	379	50
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.95			0.97			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.96			0.93			0.98			0.98	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1648			1552			1129			1087	
Flt Permitted		0.92			0.96			1.00			1.00	
Satd. Flow (perm)		1533			1498			1129			1087	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	38	82	52	13	35	54	0	246	47	0	399	53
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	172	0	0	102	0	0	293	0	0	452	0
Confl. Peds. (#/hr)	37		9	9		37			39			14
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	0%	0%	3%	0%	0%	2%	0%	5%	0%	2%	3%	4%
Parking (#/hr)								38			48	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		21.0			21.0			61.0			61.0	
Effective Green, g (s)		21.0			21.0			61.0			61.0	
Actuated g/C Ratio		0.23			0.23			0.68			0.68	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		357			349			765			736	
v/s Ratio Prot								0.26			c0.42	
v/s Ratio Perm		c0.11			0.07							
v/c Ratio		0.48			0.29			0.38			0.61	
Uniform Delay, d1		29.8			28.4			6.3			8.0	
Progression Factor		1.00			1.00			0.63			0.25	
Incremental Delay, d2		4.6			2.1			1.3			3.1	
Delay (s)		34.4			30.5			5.3			5.1	
Level of Service		C			C			A			A	
Approach Delay (s)		34.4			30.5			5.3			5.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1136: Ashland Ave. & W 47th St./ S. McDowell Ave.

9/16/2013

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBT	NBR	NBR2	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↑	↱		↑	↱
Volume (vph)	72	279	28	138	405	91	6	230	13	51	325	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	10	11	11	11	11	11
Total Lost time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.79		1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.97	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1478	2856		1540	2778			1041	1157		1506	1191
Flt Permitted	0.40	1.00		0.50	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	627	2856		802	2778			1041	1157		1506	1191
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	76	294	29	145	426	96	6	242	14	54	342	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	76	323	0	145	528	0	0	242	68	0	342	58
Confl. Peds. (#/hr)			53	53		74			75			25
Confl. Bikes (#/hr)						4			2			
Heavy Vehicles (%)	8%	9%	11%	1%	9%	6%	0%	7%	0%	2%	4%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								52			0	0
Turn Type	pm+pt	NA		pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	34.4	29.6		38.8	31.8			41.4	41.4		41.4	41.4
Effective Green, g (s)	34.4	29.6		38.8	31.8			41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.38	0.33		0.43	0.35			0.46	0.46		0.46	0.46
Clearance Time (s)	3.0	5.0		3.0	5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	285	939		403	981			478	532		692	547
v/s Ratio Prot	0.01	0.11		c0.03	c0.19			c0.23			0.23	
v/s Ratio Perm	0.09			0.13					0.06			0.05
v/c Ratio	0.27	0.34		0.36	0.54			0.51	0.13		0.49	0.11
Uniform Delay, d1	18.2	22.9		16.2	23.2			17.1	13.9		17.0	13.8
Progression Factor	1.00	1.00		1.00	1.00			0.59	0.68		0.64	0.59
Incremental Delay, d2	0.5	1.0		0.6	2.1			3.5	0.5		2.0	0.3
Delay (s)	18.7	23.9		16.7	25.4			13.6	10.0		13.0	8.4
Level of Service	B	C		B	C			B	B		B	A
Approach Delay (s)		22.9			23.5			12.8			12.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SWR2
Lane Configurations	↱
Volume (vph)	25
Ideal Flow (vphpl)	1800
Lane Width	12
Total Lost time (s)	5.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.86
Flt Protected	1.00
Satd. Flow (prot)	1557
Flt Permitted	1.00
Satd. Flow (perm)	1557
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	26
RTOR Reduction (vph)	0
Lane Group Flow (vph)	26
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	31.8
Effective Green, g (s)	31.8
Actuated g/C Ratio	0.35
Clearance Time (s)	5.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	550
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.05
Uniform Delay, d1	19.1
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	19.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1137: Ashland Ave. & W 48th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations					✥			↑			↳	
Volume (vph)	0	0	0	22	44	18	0	322	0	0	617	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.97			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1642			1205			1073	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1642			1205			1073	
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.95	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	23	46	19	0	339	0	0	649	62
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	88	0	0	339	0	0	711	0
Confl. Peds. (#/hr)			20	20		21			10			27
Heavy Vehicles (%)	0%	0%	0%	0%	5%	0%	9%	4%	0%	0%	3%	5%
Parking (#/hr)								36			50	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			58.0			58.0	
Effective Green, g (s)					23.0			58.0			58.0	
Actuated g/C Ratio					0.26			0.64			0.64	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					419			776			691	
v/s Ratio Prot								0.28			c0.66	
v/s Ratio Perm					0.05							
v/c Ratio					0.21			0.44			1.03	
Uniform Delay, d1					26.4			7.9			16.0	
Progression Factor					1.00			1.08			0.74	
Incremental Delay, d2					1.1			1.7			41.2	
Delay (s)					27.5			10.2			53.1	
Level of Service					C			B			D	
Approach Delay (s)		0.0			27.5			10.2			53.1	
Approach LOS		A			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1138: Ashland Ave. & W 49th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	44	74	24	12	29	24	0	232	34	0	411	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.98			0.99			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.98			0.95			0.98			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1706			1641			1108			1086	
Flt Permitted		0.89			0.94			1.00			1.00	
Satd. Flow (perm)		1549			1562			1108			1086	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	46	78	25	13	31	25	0	244	36	0	433	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	149	0	0	69	0	0	280	0	0	457	0
Confl. Peds. (#/hr)	17					17			18			26
Confl. Bikes (#/hr)									1			2
Heavy Vehicles (%)	0%	0%	4%	0%	0%	4%	0%	4%	3%	0%	3%	0%
Parking (#/hr)								44			50	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			57.0			57.0	
Effective Green, g (s)		24.0			24.0			57.0			57.0	
Actuated g/C Ratio		0.27			0.27			0.63			0.63	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		413			416			701			687	
v/s Ratio Prot								0.25			c0.42	
v/s Ratio Perm		c0.10			0.04							
v/c Ratio		0.36			0.17			0.40			0.67	
Uniform Delay, d1		26.8			25.3			8.1			10.5	
Progression Factor		1.00			1.00			0.76			0.10	
Incremental Delay, d2		2.4			0.9			1.6			0.5	
Delay (s)		29.2			26.2			7.8			1.5	
Level of Service		C			C			A			A	
Approach Delay (s)		29.2			26.2			7.8			1.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↱			↱	
Volume (vph)	20	18	16	14	10	37	0	240	20	0	401	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.97			0.99			0.99	
Flpb, ped/bikes		0.99			0.98			1.00			1.00	
Frt		0.96			0.92			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1633			1565			1112			1473	
Flt Permitted		0.91			0.94			1.00			1.00	
Satd. Flow (perm)		1505			1496			1112			1473	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	21	19	17	15	11	39	0	253	21	0	422	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	57	0	0	65	0	0	274	0	0	465	0
Confl. Peds. (#/hr)	13		40	40		13			25			42
Confl. Bikes (#/hr)			1						2			2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	4%	0%
Parking (#/hr)								44			0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		25.0			25.0			56.0			56.0	
Effective Green, g (s)		25.0			25.0			56.0			56.0	
Actuated g/C Ratio		0.28			0.28			0.62			0.62	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		418			415			691			916	
v/s Ratio Prot								0.25			c0.32	
v/s Ratio Perm		0.04			c0.04							
v/c Ratio		0.14			0.16			0.40			0.51	
Uniform Delay, d1		24.4			24.5			8.5			9.4	
Progression Factor		1.00			1.00			1.73			0.36	
Incremental Delay, d2		0.7			0.8			1.6			1.6	
Delay (s)		25.1			25.3			16.3			4.9	
Level of Service		C			C			B			A	
Approach Delay (s)		25.1			25.3			16.3			4.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1140: Ashland Ave. & W 51st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	92	219	46	54	298	44	0	244	19	0	347	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.90		1.00	0.92		1.00	0.94
Flpb, ped/bikes	0.96	1.00	1.00	0.96	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1473	1631	1314	1476	1541	1259		1143	888		1088	879
Flt Permitted	0.43	1.00	1.00	0.54	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	670	1631	1314	842	1541	1259		1143	888		1088	879
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	231	48	57	314	46	0	257	20	0	365	57
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	97	231	48	57	314	46	0	257	20	0	365	57
Confl. Peds. (#/hr)	29		21	21		29			20			13
Confl. Bikes (#/hr)			2			1						1
Heavy Vehicles (%)	4%	3%	0%	4%	9%	2%	3%	5%	5%	8%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								42	42		50	50
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	31.0	31.0	31.0	31.0	31.0	31.0		50.0	50.0		50.0	50.0
Effective Green, g (s)	31.0	31.0	31.0	31.0	31.0	31.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.56	0.56		0.56	0.56
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	230	561	452	290	530	433		635	493		604	488
v/s Ratio Prot		0.14			c0.20			0.22			c0.34	
v/s Ratio Perm	0.14		0.04	0.07		0.04			0.02			0.06
v/c Ratio	0.42	0.41	0.11	0.20	0.59	0.11		0.40	0.04		0.60	0.12
Uniform Delay, d1	22.6	22.5	20.1	20.7	24.3	20.1		11.5	9.1		13.4	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.33	0.41		0.34	0.44
Incremental Delay, d2	5.6	2.2	0.5	1.5	4.8	0.5		1.8	0.1		4.0	0.4
Delay (s)	28.2	24.8	20.5	22.3	29.1	20.6		5.6	3.9		8.6	4.6
Level of Service	C	C	C	C	C	C		A	A		A	A
Approach Delay (s)		25.1			27.2			5.5			8.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1142: Ashland Ave. & W 53rd St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣			↑			↳	
Volume (vph)	0	0	0	16	10	13	0	282	3	0	421	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	11	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.97			1.00			1.00	
Frt					0.95			1.00			0.99	
Flt Protected					0.98			1.00			1.00	
Satd. Flow (prot)					1607			1202			1106	
Flt Permitted					0.98			1.00			1.00	
Satd. Flow (perm)					1607			1202			1106	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	0	0	0	17	11	14	0	297	3	0	443	20
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	42	0	0	300	0	0	463	0
Confl. Peds. (#/hr)			41	41		12			30			4
Confl. Bikes (#/hr)			4						3			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	20%	3%	5%
Parking (#/hr)								36			48	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					23.0			58.0			58.0	
Effective Green, g (s)					23.0			58.0			58.0	
Actuated g/C Ratio					0.26			0.64			0.64	
Clearance Time (s)					5.0			4.0			4.0	
Lane Grp Cap (vph)					410			774			712	
v/s Ratio Prot								0.25			c0.42	
v/s Ratio Perm					0.03							
v/c Ratio					0.10			0.39			0.65	
Uniform Delay, d1					25.6			7.6			9.8	
Progression Factor					1.00			0.59			1.03	
Incremental Delay, d2					0.5			1.4			4.0	
Delay (s)					26.1			5.8			14.1	
Level of Service					C			A			B	
Approach Delay (s)		0.0			26.1			5.8			14.1	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1144: Ashland Ave. & W Garfield Blvd. (WB)

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↑↑	↱		↑			↑	↱
Volume (vph)	0	0	0	156	864	63	0	253	0	0	340	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	9	10	10	11	11	11	11	11	11
Total Lost time (s)				5.0	5.0	5.0		3.0			3.0	3.0
Lane Util. Factor				1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes				1.00	1.00	0.92		1.00			1.00	0.97
Flpb, ped/bikes				1.00	1.00	1.00		1.00			1.00	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1494	3129	1288		1464			1188	1006
Flt Permitted				0.95	1.00	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1494	3129	1288		1464			1188	1006
Peak-hour factor, PHF	0.91	0.91	0.95	0.95	0.95	0.95	0.91	0.95	0.95	0.91	0.95	0.95
Adj. Flow (vph)	0	0	0	164	909	66	0	266	0	0	358	93
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	164	909	66	0	266	0	0	358	93
Confl. Peds. (#/hr)						41			29			19
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	3%	2%	2%	4%	7%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	3
Parking (#/hr)								0			38	38
Turn Type				Perm	NA	Perm		NA			NA	Perm
Protected Phases					8			2 5			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				31.0	31.0	31.0		36.0			42.0	42.0
Effective Green, g (s)				31.0	31.0	31.0		36.0			42.0	42.0
Actuated g/C Ratio				0.34	0.34	0.34		0.40			0.47	0.47
Clearance Time (s)				5.0	5.0	5.0					3.0	3.0
Lane Grp Cap (vph)				514	1077	443		585			554	469
v/s Ratio Prot					c0.29			c0.18			c0.30	
v/s Ratio Perm				0.11		0.05						0.09
v/c Ratio				0.32	0.84	0.15		0.45			0.65	0.20
Uniform Delay, d1				21.7	27.3	20.4		19.8			18.3	14.1
Progression Factor				1.00	1.00	1.00		0.54			0.65	0.61
Incremental Delay, d2				1.6	8.1	0.7		2.2			4.8	0.8
Delay (s)				23.4	35.4	21.1		12.9			16.7	9.4
Level of Service				C	D	C		B			B	A
Approach Delay (s)		0.0			32.8			12.9			15.2	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱					↑	↱		↑	
Volume (vph)	69	709	115	0	0	0	0	256	124	0	468	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0					3.0	3.0		5.0	
Lane Util. Factor	1.00	0.95	1.00					1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.93					1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00		1.00	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1494	3099	1283					1259	1102		1506	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1494	3099	1283					1259	1102		1506	
Peak-hour factor, PHF	0.95	0.95	0.95	0.94	0.94	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	73	746	121	0	0	0	0	269	131	0	493	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	73	746	121	0	0	0	0	269	131	0	493	0
Confl. Peds. (#/hr)			31						8			23
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	3%	3%	4%	0%	0%	0%	0%	5%	0%	4%	4%	0%
Parking (#/hr)								28	28		0	
Turn Type	Perm	NA	Perm					NA	Perm		NA	
Protected Phases		4						2			1 6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	31.0	31.0	31.0					32.0	32.0		49.0	
Effective Green, g (s)	31.0	31.0	31.0					32.0	32.0		49.0	
Actuated g/C Ratio	0.34	0.34	0.34					0.36	0.36		0.54	
Clearance Time (s)	5.0	5.0	5.0					3.0	3.0			
Lane Grp Cap (vph)	514	1067	441					447	391		819	
v/s Ratio Prot		c0.24						0.21			c0.33	
v/s Ratio Perm	0.05		0.09						0.12			
v/c Ratio	0.14	0.70	0.27					0.60	0.34		0.60	
Uniform Delay, d1	20.3	25.5	21.4					23.8	21.2		13.9	
Progression Factor	1.00	1.00	1.00					0.72	0.73		0.78	
Incremental Delay, d2	0.6	3.8	1.5					5.5	2.1		2.8	
Delay (s)	20.9	29.3	22.9					22.6	17.5		13.6	
Level of Service	C	C	C					C	B		B	
Approach Delay (s)		27.8			0.0			20.9			13.6	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1148: Ashland Ave. & W 57th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↱	
Volume (vph)	16	18	47	0	0	0	0	328	15	0	447	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.97						1.00			1.00	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.92						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1569						1172			1104	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1569						1172			1104	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	19	49	0	0	0	0	345	16	0	471	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	85	0	0	0	0	0	361	0	0	471	0
Confl. Peds. (#/hr)	42		16			42			22			29
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	4%	0%
Parking (#/hr)								40			48	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						58.0			58.0	
Effective Green, g (s)		23.0						58.0			58.0	
Actuated g/C Ratio		0.26						0.64			0.64	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		400						755			711	
v/s Ratio Prot								0.31			c0.43	
v/s Ratio Perm		0.05										
v/c Ratio		0.21						0.48			0.66	
Uniform Delay, d1		26.4						8.2			9.9	
Progression Factor		1.00						0.98			0.62	
Incremental Delay, d2		1.2						2.0			4.1	
Delay (s)		27.6						10.0			10.3	
Level of Service		C						B			B	
Approach Delay (s)		27.6			0.0			10.0			10.3	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1150: Ashland Ave. & W 59th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	80	242	62	111	404	36	0	292	40	0	516	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.65	1.00	1.00	0.97		1.00	1.00		1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	0.91	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1594	1556	883	1457	1600	1340		1288	1125		1506	1220
Flt Permitted	0.33	1.00	1.00	0.48	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	553	1556	883	743	1600	1340		1288	1125		1506	1220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	84	255	65	117	425	38	0	307	42	0	543	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	84	255	65	117	425	38	0	307	42	0	543	37
Confl. Peds. (#/hr)	5		120	120		5						19
Heavy Vehicles (%)	0%	8%	5%	0%	5%	3%	2%	4%	0%	7%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	35.0	31.0	31.0	38.2	32.6	32.6		41.4	41.4		41.4	41.4
Effective Green, g (s)	35.0	31.0	31.0	38.2	32.6	32.6		41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.39	0.34	0.34	0.42	0.36	0.36		0.46	0.46		0.46	0.46
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	261	535	304	359	579	485		592	517		692	561
v/s Ratio Prot	0.01	0.16		c0.02	c0.27			0.24			c0.36	
v/s Ratio Perm	0.11		0.07	0.12		0.03			0.04			0.03
v/c Ratio	0.32	0.48	0.21	0.33	0.73	0.08		0.52	0.08		0.78	0.07
Uniform Delay, d1	18.5	23.1	20.9	16.5	24.9	18.8		17.2	13.6		20.5	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.89	0.80		0.83	1.13
Incremental Delay, d2	0.7	3.0	1.6	0.5	8.0	0.3		3.0	0.3		7.5	0.2
Delay (s)	19.2	26.2	22.5	17.0	33.0	19.2		18.3	11.2		24.5	15.5
Level of Service	B	C	C	B	C	B		B	B		C	B
Approach Delay (s)		24.1			28.8			17.5			23.9	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1152: Ashland Ave. & W 61st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	31	24	50	0	0	0	0	309	28	0	553	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	16	16	16	16	16	16	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.99						1.00			1.00	
Frt		0.94						0.99			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		1808						1235			1064	
Flt Permitted		0.99						1.00			1.00	
Satd. Flow (perm)		1808						1235			1064	
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	33	25	53	0	0	0	0	325	29	0	582	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	111	0	0	0	0	0	354	0	0	582	0
Confl. Peds. (#/hr)	10		16			10			38			28
Confl. Bikes (#/hr)									1			3
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	2%	0%	14%	3%	0%
Parking (#/hr)								32			54	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		23.0						58.0			58.0	
Effective Green, g (s)		23.0						58.0			58.0	
Actuated g/C Ratio		0.26						0.64			0.64	
Clearance Time (s)		5.0						4.0			4.0	
Lane Grp Cap (vph)		462						795			685	
v/s Ratio Prot								0.29			c0.55	
v/s Ratio Perm		0.06										
v/c Ratio		0.24						0.45			0.85	
Uniform Delay, d1		26.6						8.0			12.6	
Progression Factor		1.00						1.00			0.62	
Incremental Delay, d2		1.2						1.8			9.8	
Delay (s)		27.8						9.8			17.6	
Level of Service		C						A			B	
Approach Delay (s)		27.8			0.0			9.8			17.6	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

1154: Ashland Ave. & W 63rd St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	55	400	90	112	481	48	0	317	44	0	615	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	10	10	12	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	0.99			1.00	0.62		1.00	0.64
Flpb, ped/bikes	0.96	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1503	1615	1236	1517	1591			1673	782		1673	924
Flt Permitted	0.25	1.00	1.00	0.38	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	391	1615	1236	601	1591			1673	782		1673	924
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.95	0.95
Adj. Flow (vph)	58	421	95	118	506	51	0	334	46	0	647	82
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	58	421	95	118	557	0	0	334	46	0	647	82
Confl. Peds. (#/hr)	86		72	72		86			129			122
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	9%	4%	1%	0%	3%	0%	5%	4%	5%	2%	4%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	0
Parking (#/hr)									0			
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	39.0	39.0	39.0	39.0	39.0			44.0	44.0		44.0	44.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0			44.0	44.0		44.0	44.0
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43			0.49	0.49		0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	169	699	535	260	689			817	382		817	451
v/s Ratio Prot		0.26			c0.35			0.20			c0.39	
v/s Ratio Perm	0.15		0.08	0.20					0.06			0.09
v/c Ratio	0.34	0.60	0.18	0.45	0.81			0.41	0.12		0.79	0.18
Uniform Delay, d1	17.0	19.6	15.7	18.0	22.2			14.7	12.5		19.2	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.77	0.93		0.60	0.54
Incremental Delay, d2	5.5	3.8	0.7	5.6	9.9			1.5	0.6		6.0	0.7
Delay (s)	22.4	23.4	16.4	23.6	32.1			12.8	12.2		17.4	7.6
Level of Service	C	C	B	C	C			B	B		B	A
Approach Delay (s)		22.1			30.6			12.7			16.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣			↱			↱	
Volume (vph)	0	0	0	12	22	27	0	352	0	0	494	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	16	16	16	11	11	11	11	11	11
Total Lost time (s)					5.0			4.0			4.0	
Lane Util. Factor					1.00			1.00			1.00	
Frpb, ped/bikes					0.98			1.00			0.99	
Flpb, ped/bikes					0.99			1.00			1.00	
Frt					0.94			1.00			0.99	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1847			1436			1201	
Flt Permitted					0.99			1.00			1.00	
Satd. Flow (perm)					1847			1436			1201	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	13	23	28	0	371	0	0	520	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	64	0	0	371	0	0	545	0
Confl. Peds. (#/hr)			6	6		5			41			42
Confl. Bikes (#/hr)			1									3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Parking (#/hr)								10			36	
Turn Type				Perm	NA			NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8								
Actuated Green, G (s)					7.8			73.2			73.2	
Effective Green, g (s)					7.8			73.2			73.2	
Actuated g/C Ratio					0.09			0.81			0.81	
Clearance Time (s)					5.0			4.0			4.0	
Vehicle Extension (s)					5.0			3.0			3.0	
Lane Grp Cap (vph)					160			1167			976	
v/s Ratio Prot								0.26			c0.45	
v/s Ratio Perm					0.03							
v/c Ratio					0.40			0.32			0.56	
Uniform Delay, d1					38.9			2.1			2.9	
Progression Factor					1.00			0.20			1.00	
Incremental Delay, d2					3.4			0.6			1.7	
Delay (s)					42.3			1.0			4.6	
Level of Service					D			A			A	
Approach Delay (s)		0.0			42.3			1.0			4.6	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1158: Ashland Ave. & W Marquette Rd.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↱			↱	
Volume (vph)	48	340	92	112	387	30	0	345	30	0	462	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	10	9	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1531	1647	1300	1531	1680	1351		1180			1129	
Flt Permitted	0.35	1.00	1.00	0.35	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	567	1647	1300	557	1680	1351		1180			1129	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.98	0.95	0.95	0.98	0.95	0.95
Adj. Flow (vph)	51	358	97	118	407	32	0	363	32	0	486	34
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	51	358	97	118	407	32	0	395	0	0	520	0
Confl. Peds. (#/hr)	21		22	22		21			32			32
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	2%	4%	0%	0%	0%	0%	3%	0%	10%	3%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		44	44
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	33.2	30.2	30.2	37.2	32.2	32.2		41.8			41.8	
Effective Green, g (s)	33.2	30.2	30.2	37.2	32.2	32.2		41.8			41.8	
Actuated g/C Ratio	0.37	0.34	0.34	0.41	0.36	0.36		0.46			0.46	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		5.0			5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	241	552	436	284	601	483		548			524	
v/s Ratio Prot	0.01	0.22		c0.02	c0.24			0.33			c0.46	
v/s Ratio Perm	0.07		0.07	0.15		0.02						
v/c Ratio	0.21	0.65	0.22	0.42	0.68	0.07		0.72			0.99	
Uniform Delay, d1	19.1	25.4	21.5	17.7	24.5	19.0		19.4			23.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.95			0.57	
Incremental Delay, d2	0.4	5.8	1.2	1.0	6.0	0.3		7.5			34.9	
Delay (s)	19.6	31.2	22.6	18.7	30.5	19.3		25.9			48.6	
Level of Service	B	C	C	B	C	B		C			D	
Approach Delay (s)		28.4			27.4			25.9			48.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1160: Ashland Ave. & W 69th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰	↱		↑	↱		↑	↱
Volume (vph)	42	291	52	64	292	34	0	278	58	0	492	71
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95			1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.81		1.00	0.91		1.00	0.84
Flpb, ped/bikes		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Frt		0.98			1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99			0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		3037			1642	1164		1149	1342		1037	1229
Flt Permitted		0.81			0.85	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		2461			1414	1164		1149	1342		1037	1229
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	306	55	67	307	36	0	293	61	0	518	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	405	0	0	374	36	0	293	61	0	518	75
Confl. Peds. (#/hr)	91		48	48		91			52			54
Confl. Bikes (#/hr)						2						1
Heavy Vehicles (%)	0%	3%	10%	0%	5%	3%	6%	3%	0%	4%	4%	1%
Parking (#/hr)								44			56	
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)		29.0			29.0	29.0		52.0	52.0		52.0	52.0
Effective Green, g (s)		29.0			29.0	29.0		52.0	52.0		52.0	52.0
Actuated g/C Ratio		0.32			0.32	0.32		0.58	0.58		0.58	0.58
Clearance Time (s)		5.0			5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		792			455	375		663	775		599	710
v/s Ratio Prot								0.26			c0.50	
v/s Ratio Perm		0.16			c0.26	0.03			0.05			0.06
v/c Ratio		0.51			0.82	0.10		0.44	0.08		0.86	0.11
Uniform Delay, d1		24.8			28.1	21.3		10.8	8.4		16.0	8.5
Progression Factor		1.00			1.00	1.00		1.21	1.08		0.67	0.52
Incremental Delay, d2		2.4			15.3	0.5		2.0	0.2		11.4	0.2
Delay (s)		27.1			43.5	21.8		15.0	9.3		22.2	4.6
Level of Service		C			D	C		B	A		C	A
Approach Delay (s)		27.1			41.6			14.0			20.0	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1162: Ashland Ave. & W 71st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↱			↱	
Volume (vph)	61	337	78	107	368	84	0	319	15	0	537	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.92		1.00			0.99	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)	1537	1647	1324	1551	1663	1294		1424			1494	
Flt Permitted	0.31	1.00	1.00	0.36	1.00	1.00		1.00			1.00	
Satd. Flow (perm)	506	1647	1324	580	1663	1294		1424			1494	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	64	355	82	113	387	88	0	336	16	0	565	55
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	64	355	82	113	387	88	0	352	0	0	620	0
Confl. Peds. (#/hr)	38		31	31		38			20			29
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	3%	2%	0%	2%	1%	1%	8%	3%	0%	7%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								10	10		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	32.6	28.6	28.6	32.6	28.6	28.6		45.4			45.4	
Effective Green, g (s)	32.6	28.6	28.6	32.6	28.6	28.6		45.4			45.4	
Actuated g/C Ratio	0.36	0.32	0.32	0.36	0.32	0.32		0.50			0.50	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	229	523	420	253	528	411		718			753	
v/s Ratio Prot	0.01	0.22		c0.02	c0.23			0.25			c0.42	
v/s Ratio Perm	0.09		0.06	0.14		0.07						
v/c Ratio	0.28	0.68	0.20	0.45	0.73	0.21		0.49			0.82	
Uniform Delay, d1	19.9	26.7	22.3	21.2	27.3	22.5		14.7			18.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			0.60	
Incremental Delay, d2	0.7	6.9	1.0	1.3	8.7	1.2		2.4			5.6	
Delay (s)	20.6	33.6	23.4	22.5	36.0	23.7		17.1			17.0	
Level of Service	C	C	C	C	D	C		B			B	
Approach Delay (s)		30.3			31.6			17.1			17.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1168: Ashland Ave. & W 74th St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↑	↱		↑	↱
Volume (vph)	41	157	60	49	339	88	0	260	21	0	557	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.91		1.00	0.96		1.00	0.94		1.00	0.88
Flpb, ped/bikes		1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)		1617	1265		1603	1373		1520	1385		1520	1204
Flt Permitted		0.83	1.00		0.94	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1352	1265		1509	1373		1520	1385		1520	1204
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.97	0.95	0.95
Adj. Flow (vph)	43	165	63	52	357	93	0	274	22	0	586	38
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	208	63	0	409	93	0	274	22	0	586	38
Confl. Peds. (#/hr)	12		44	44		12			19			44
Heavy Vehicles (%)	0%	8%	3%	0%	4%	0%	9%	3%	0%	5%	3%	8%
Parking (#/hr)								0			0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		28.0	28.0		28.0	28.0		38.0	38.0		38.0	38.0
Effective Green, g (s)		28.0	28.0		28.0	28.0		38.0	38.0		38.0	38.0
Actuated g/C Ratio		0.37	0.37		0.37	0.37		0.51	0.51		0.51	0.51
Clearance Time (s)		5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0
Lane Grp Cap (vph)		504	472		563	512		770	701		770	610
v/s Ratio Prot								0.18			c0.39	
v/s Ratio Perm		0.15	0.05		c0.27	0.07			0.02			0.03
v/c Ratio		0.41	0.13		0.73	0.18		0.36	0.03		0.76	0.06
Uniform Delay, d1		17.4	15.5		20.2	15.8		11.1	9.3		14.9	9.4
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.04		1.00	1.00
Incremental Delay, d2		2.5	0.6		8.0	0.8		1.2	0.1		7.0	0.2
Delay (s)		19.9	16.1		28.2	16.6		12.3	9.8		21.8	9.6
Level of Service		B	B		C	B		B	A		C	A
Approach Delay (s)		19.0			26.0			12.1			21.1	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

	↰	→	↘	↙	←	↖	↰	↑	↱	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↑↱			↑↱	
Volume (vph)	64	290	37	88	313	82	0	210	35	0	505	32
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.98			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		3044			3014			1251			1177	
Flt Permitted		0.78			0.77			1.00			1.00	
Satd. Flow (perm)		2394			2342			1251			1177	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	67	305	39	93	329	86	0	221	37	0	532	34
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	411	0	0	508	0	0	258	0	0	566	0
Confl. Peds. (#/hr)	6		20	20		6			5			8
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	3%	2%	0%	0%	2%	1%	0%	4%	0%	7%	4%	3%
Parking (#/hr)								28			38	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		24.0			24.0			42.0			42.0	
Effective Green, g (s)		24.0			24.0			42.0			42.0	
Actuated g/C Ratio		0.32			0.32			0.56			0.56	
Clearance Time (s)		5.0			5.0			4.0			4.0	
Lane Grp Cap (vph)		766			749			700			659	
v/s Ratio Prot								0.21			c0.48	
v/s Ratio Perm		0.17			c0.22							
v/c Ratio		0.54			0.68			0.37			0.86	
Uniform Delay, d1		20.9			22.1			9.1			14.0	
Progression Factor		1.00			1.00			1.00			0.42	
Incremental Delay, d2		2.7			4.9			1.5			10.7	
Delay (s)		23.6			27.0			10.6			16.6	
Level of Service		C			C			B			B	
Approach Delay (s)		23.6			27.0			10.6			16.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1173: Ashland Ave. & W 79th St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱		↑	↱		↑	↱
Volume (vph)	96	451	30	64	479	73	0	189	28	0	553	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	9	10	9	9	10	9	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.81	1.00	1.00	0.89		1.00	0.80		1.00	0.91
Flpb, ped/bikes	0.97	1.00	1.00	0.94	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1493	1585	1118	1447	1600	1210		1188	834		1166	900
Flt Permitted	0.19	1.00	1.00	0.22	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	295	1585	1118	338	1600	1210		1188	834		1166	900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	101	475	32	67	504	77	0	199	29	0	582	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	101	475	32	67	504	77	0	199	29	0	582	67
Confl. Peds. (#/hr)	54		99	99		54			68			27
Confl. Bikes (#/hr)			1			1			1			
Heavy Vehicles (%)	0%	6%	0%	0%	5%	1%	7%	4%	0%	10%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								38	38		42	42
Turn Type	Perm	NA	Perm	Perm	NA	Perm		NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	34.0	34.0	34.0	34.0	34.0	34.0		50.0	50.0		50.0	50.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0		50.0	50.0		50.0	50.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.50	0.50		0.50	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	100	538	380	114	544	411		594	417		583	450
v/s Ratio Prot		0.30			0.32			0.17			c0.50	
v/s Ratio Perm	c0.34		0.03	0.20		0.06			0.03			0.07
v/c Ratio	1.01	0.88	0.08	0.59	0.93	0.19		0.34	0.07		1.00	0.15
Uniform Delay, d1	33.0	31.1	22.4	27.2	31.8	23.3		15.0	13.0		25.0	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.51	1.54		1.00	1.00
Incremental Delay, d2	92.7	18.6	0.4	20.3	24.1	1.0		1.4	0.3		36.9	0.7
Delay (s)	125.7	49.8	22.9	47.5	55.9	24.3		24.1	20.2		61.8	14.2
Level of Service	F	D	C	D	E	C		C	C		E	B
Approach Delay (s)		61.0			51.3			23.6			56.9	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↱			↱	
Volume (vph)	0	0	0	48	72	50	0	331	0	0	622	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	10	10	10	11	11	11	11	11	11
Total Lost time (s)					5.0	5.0		4.0			4.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.93		1.00			0.97	
Flpb, ped/bikes					0.97	1.00		1.00			1.00	
Frt					1.00	0.85		1.00			0.98	
Flt Protected					0.98	1.00		1.00			1.00	
Satd. Flow (prot)					1602	1297		1160			1007	
Flt Permitted					0.98	1.00		1.00			1.00	
Satd. Flow (perm)					1602	1297		1160			1007	
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.95	0.95	0.94	0.95	0.95	0.94	0.95	0.95
Adj. Flow (vph)	0	0	0	51	76	53	0	348	0	0	655	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	127	53	0	348	0	0	780	0
Confl. Peds. (#/hr)			31	31		25			62			51
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	3%	2%	0%	0%	3%	2%
Parking (#/hr)								44			54	
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					23.0	23.0		68.0			68.0	
Effective Green, g (s)					23.0	23.0		68.0			68.0	
Actuated g/C Ratio					0.23	0.23		0.68			0.68	
Clearance Time (s)					5.0	5.0		4.0			4.0	
Lane Grp Cap (vph)					368	298		788			684	
v/s Ratio Prot								0.30			c0.77	
v/s Ratio Perm					0.08	0.04						
v/c Ratio					0.35	0.18		0.44			1.14	
Uniform Delay, d1					32.2	30.9		7.3			16.0	
Progression Factor					1.00	1.00		0.62			0.45	
Incremental Delay, d2					2.6	1.3		1.7			73.7	
Delay (s)					34.8	32.2		6.2			80.9	
Level of Service					C	C		A			F	
Approach Delay (s)		0.0			34.0			6.2			80.9	
Approach LOS		A			C			A			F	

Intersection Summary			
HCM 2000 Control Delay	54.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1177: Ashland Ave. & W 83rd St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	75	359	105	95	355	66	0	318	52	0	627	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.89	1.00	0.99			1.00	0.80		1.00	0.92
Flpb, ped/bikes	0.98	1.00	1.00	0.96	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1520	1631	1248	1534	3087			1327	904		1081	862
Flt Permitted	0.39	1.00	1.00	0.25	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	620	1631	1248	405	3087			1327	904		1081	862
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.95	0.95	0.99	0.95	0.95
Adj. Flow (vph)	79	378	111	100	374	69	0	335	55	0	660	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	79	378	111	100	443	0	0	335	55	0	660	43
Confl. Peds. (#/hr)	14		47	47		14			65			59
Heavy Vehicles (%)	3%	3%	2%	0%	0%	0%	2%	1%	0%	0%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								26	26		52	52
Turn Type	Perm	NA	Perm	Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	27.0	27.0	27.0	27.0	27.0			64.0	64.0		64.0	64.0
Effective Green, g (s)	27.0	27.0	27.0	27.0	27.0			64.0	64.0		64.0	64.0
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.64	0.64		0.64	0.64
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	167	440	336	109	833			849	578		691	551
v/s Ratio Prot		0.23			0.14			0.25			c0.61	
v/s Ratio Perm	0.13		0.09	c0.25					0.06			0.05
v/c Ratio	0.47	0.86	0.33	0.92	0.53			0.39	0.10		0.96	0.08
Uniform Delay, d1	30.5	34.7	29.3	35.4	31.1			8.7	6.9		16.7	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.75	0.73		0.47	0.68
Incremental Delay, d2	9.3	19.2	2.6	66.1	2.4			1.3	0.3		4.1	0.0
Delay (s)	39.9	53.8	31.9	101.5	33.5			7.8	5.4		12.0	4.6
Level of Service	D	D	C	F	C			A	A		B	A
Approach Delay (s)		47.6			46.0			7.5			11.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1179: Ashland Ave. & W 85th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥						↱			↑	
Volume (vph)	38	26	38	0	0	0	0	314	45	0	721	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)		5.0						4.0			4.0	
Lane Util. Factor		1.00						1.00			1.00	
Frpb, ped/bikes		0.98						0.99			1.00	
Flpb, ped/bikes		0.98						1.00			1.00	
Frt		0.95						0.98			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		1616						1147			1149	
Flt Permitted		0.98						1.00			1.00	
Satd. Flow (perm)		1616						1147			1149	
Peak-hour factor, PHF	0.95	0.95	0.95	0.90	0.90	0.95	0.90	0.95	0.95	0.90	0.95	0.95
Adj. Flow (vph)	40	27	40	0	0	0	0	331	47	0	759	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	107	0	0	0	0	0	378	0	0	759	0
Confl. Peds. (#/hr)	11		5			11			19			16
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Parking (#/hr)								42			44	
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		10.0						81.0			81.0	
Effective Green, g (s)		10.0						81.0			81.0	
Actuated g/C Ratio		0.10						0.81			0.81	
Clearance Time (s)		5.0						4.0			4.0	
Vehicle Extension (s)		6.0						3.0			3.0	
Lane Grp Cap (vph)		161						929			930	
v/s Ratio Prot								0.33			c0.66	
v/s Ratio Perm		0.07										
v/c Ratio		0.66						0.41			0.82	
Uniform Delay, d1		43.4						2.7			5.3	
Progression Factor		1.00						0.99			0.63	
Incremental Delay, d2		15.1						1.2			4.1	
Delay (s)		58.5						3.9			7.5	
Level of Service		E						A			A	
Approach Delay (s)		58.5			0.0			3.9			7.5	
Approach LOS		E			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1181: Ashland Ave. & W 87th St.

9/16/2013

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↑	↱		↑	↱
Volume (vph)	94	838	174	126	1092	157	0	297	38	0	542	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	10	10	11	10	11	11	11	11	11	11
Total Lost time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.90		1.00	0.90		1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	1596	3179	1207	1562	3210	1253		1262	973		1092	883
Flt Permitted	0.12	1.00	1.00	0.13	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)	207	3179	1207	214	3210	1253		1262	973		1092	883
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	99	882	183	133	1149	165	0	313	40	0	571	89
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	99	882	183	133	1149	165	0	313	40	0	571	89
Confl. Peds. (#/hr)	39		56	56		39			78			22
Heavy Vehicles (%)	0%	4%	3%	2%	3%	3%	3%	2%	0%	3%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								32	32		52	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm		NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	37.2	32.4	32.4	41.4	34.6	34.6		48.6	48.6		48.6	48.6
Effective Green, g (s)	37.2	32.4	32.4	41.4	34.6	34.6		48.6	48.6		48.6	48.6
Actuated g/C Ratio	0.37	0.32	0.32	0.41	0.35	0.35		0.49	0.49		0.49	0.49
Clearance Time (s)	2.0	5.0	5.0	2.0	5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	143	1029	391	182	1110	433		613	472		530	429
v/s Ratio Prot	0.03	0.28		c0.05	c0.36			0.25			c0.52	
v/s Ratio Perm	0.22		0.15	0.25		0.13			0.04			0.10
v/c Ratio	0.69	0.86	0.47	0.73	1.04	0.38		0.51	0.08		1.08	0.21
Uniform Delay, d1	24.7	31.6	26.9	21.6	32.7	24.6		17.6	13.8		25.7	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.86	0.91		0.80	0.69
Incremental Delay, d2	13.5	9.2	4.0	14.0	36.5	2.5		2.9	0.3		52.5	0.6
Delay (s)	38.3	40.8	30.9	35.6	69.2	27.2		18.0	12.8		73.1	10.8
Level of Service	D	D	C	D	E	C		B	B		E	B
Approach Delay (s)		39.0			61.3			17.4			64.7	
Approach LOS		D			E			B			E	

Intersection Summary			
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1185: Ashland Ave. & W 91st St.

9/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑	↱		↑	↱
Volume (vph)	15	30	34	35	6	27	0	356	20	0	663	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Total Lost time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.97			0.97			1.00	0.91		1.00	0.96
Flpb, ped/bikes		0.99			0.98			1.00	1.00		1.00	1.00
Frt		0.94			0.95			1.00	0.85		1.00	0.85
Flt Protected		0.99			0.97			1.00	1.00		1.00	1.00
Satd. Flow (prot)		1515			1486			1054	1349		1166	1416
Flt Permitted		0.93			0.79			1.00	1.00		1.00	1.00
Satd. Flow (perm)		1427			1206			1054	1349		1166	1416
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	32	36	37	6	28	0	375	21	0	698	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	84	0	0	71	0	0	375	21	0	698	8
Confl. Peds. (#/hr)	11		9	9		11			18			6
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	10%	4%	0%	11%	3%	0%
Parking (#/hr)								54			42	
Turn Type	Perm	NA		Perm	NA			NA	Perm		NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		12.0			12.0			79.0	79.0		79.0	79.0
Effective Green, g (s)		12.0			12.0			79.0	79.0		79.0	79.0
Actuated g/C Ratio		0.12			0.12			0.79	0.79		0.79	0.79
Clearance Time (s)		5.0			5.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)		8.0			8.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		171			144			832	1065		921	1118
v/s Ratio Prot								0.36			c0.60	
v/s Ratio Perm		0.06			c0.06				0.02			0.01
v/c Ratio		0.49			0.49			0.45	0.02		0.76	0.01
Uniform Delay, d1		41.1			41.2			3.4	2.2		5.5	2.2
Progression Factor		1.00			1.00			1.00	1.00		0.59	0.70
Incremental Delay, d2		9.2			10.9			1.8	0.0		3.5	0.0
Delay (s)		50.3			52.1			5.2	2.3		6.8	1.6
Level of Service		D			D			A	A		A	A
Approach Delay (s)		50.3			52.1			5.0			6.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↑	↱		↑	↱
Volume (vph)	157	668	68	22	820	156	0	317	19	0	429	113
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	10	11	11	10	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.99			1.00	0.94		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			1.00	1.00		1.00	1.00
Satd. Flow (prot)	1549	3149	1330	1584	3119			1520	1237		1520	1241
Flt Permitted	0.13	1.00	1.00	0.36	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	204	3149	1330	608	3119			1520	1237		1520	1241
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95
Adj. Flow (vph)	165	703	72	23	863	164	0	334	20	0	452	119
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	165	703	72	23	1027	0	0	334	20	0	452	119
Confl. Peds. (#/hr)	30		39	39		30			52			18
Heavy Vehicles (%)	3%	5%	2%	0%	2%	4%	2%	3%	0%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	3	0	0	3
Parking (#/hr)								0	0		0	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA			NA	Perm		NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	52.7	47.7	47.7	42.8	40.8			39.0	39.0		39.0	39.0
Effective Green, g (s)	52.7	47.7	47.7	42.8	40.8			39.0	39.0		39.0	39.0
Actuated g/C Ratio	0.52	0.47	0.47	0.42	0.40			0.38	0.38		0.38	0.38
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	223	1476	623	275	1251			582	474		582	475
v/s Ratio Prot	c0.06	0.22		0.00	c0.33			0.22			c0.30	
v/s Ratio Perm	0.32		0.05	0.03					0.02			0.10
v/c Ratio	0.74	0.48	0.12	0.08	0.82			0.57	0.04		0.78	0.25
Uniform Delay, d1	17.7	18.5	15.2	17.3	27.2			24.8	19.6		27.5	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	12.1	1.1	0.4	0.1	6.1			4.1	0.2		9.8	1.3
Delay (s)	29.8	19.6	15.5	17.5	33.3			28.9	19.8		37.3	22.6
Level of Service	C	B	B	B	C			C	B		D	C
Approach Delay (s)		21.1			33.0			28.3			34.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	101.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C
Parking Supply and Parking Demand Analysis

Parking Supply Analysis

ITDP

Western & Ashland Parking Supply Analysis

For internal distribution only

Western & Ashland Parking
Supply Analysis

ITDP Institute for Transportation
& Development Policy
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This report was prepared by Annie Weinstock, Christopher Van Eyken, and Rachel Weinberger, on behalf of the Institute for Transportation and Development Policy. It was funded by a grant from the Rockefeller Foundation.

Introduction

The analysis in this report is based on data collected along the Western Avenue and Ashland Ave/Clark Street from 95th street, at the southern boundary, to Howard Street at the north. Field teams were deployed on April 19th, 20th, 23rd, 24th and 26th, 2012. Surveyors recorded the presence of free and paid parking spaces, curb cuts, fire hydrants, parking restrictions – including snow clearance, residential permit requirements and street sweeping – parking rates and hours in effect, disabled access, and other uses along the curb. Data were collected on both sides of the corridors, as well as on cross streets at a depth of one block to the east and west sides of the corridors.

The Ashland Corridor follows Ashland Avenue from 95th Street in the south until it intersects with Clark Street, and then follows Clark Street to Howard Street. The Western Corridor follows Western Avenue from 95th Street to Howard.

The following analysis indicates how the curb lanes are currently programmed and discusses how many parking spaces may be displaced if either corridor is redesigned as a bus rapid transit (BRT) corridor. In addition to the potential displacement along the corridors, opportunities for replacement are identified on the cross streets one block to the east and to the west of both Western and Ashland. The analysis is organized by ward and shown graphically by block.

In addition to the on-street parking shown graphically, we note the presence of off-street private lots –i.e., lots that provide accessory parking to commercial uses along the corridor. Depending on the usage in these lots, excess capacity can potentially be repurposed as “shared parking” to serve some of the demand which may be displaced by the BRT system.

This study is a parking supply-side study. This means that while it identifies the existence of all parking spaces (free, paid, and permit) along both corridors and the cross streets, it does not establish what the demand is for these spaces. Understanding the parking supply is a necessary first step towards identifying potential parking impacts on these corridors, should a BRT require parking removal. However, until demand for these spaces is known (e.g., through a parking utilization study), and until a conceptual design of the BRT is established, an assessment of parking impacts and the potential for parking replacement cannot be done.

Existing Parking Supply

Western Corridor Overview

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western Ave	3,738	532	0	99	1
Cross Streets	7,075	192	1,257	66	47
Total	10,813	724	1,257	165	48

Figure 1: Existing Parking Supply on Western Corridor

Along the Western Corridor there are 532 “Pay and Display” (i.e., paid) parking spaces and 3,738 free parking spaces. The cross streets have an additional 192 Pay and Display spaces and 7,075 free spots. Of the 18 wards that the corridor traverses, Ward 27 is the least affected, with 69 free parking spaces along the corridor. Ward 1, at the other extreme, has 610 free parking spaces which would have to be addressed. The differences are due primarily to the differences in how much of the corridor falls within each ward boundary. The only wards that contain Pay and Display meters are Wards 1, 15, 40, 47, 49, and 50.

Ashland Corridor Overview

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland / Clark	3,789	1,090	18	120	6
Cross Streets	6,732	728	1,145	110	66
Total	10,521	1,818	1,163	230	72

Figure 2: Existing Parking Supply on Ashland Corridor.

Along the Ashland Corridor there are 1,090 Pay and Display parking spaces and 3,789 free parking spaces. The cross streets have an additional 728 Pay and Display spaces and 6,732 free spots. The Pay and Display spaces on this corridor are heavily concentrated along the Clark Street segment. Ward 26 is least affected with only 55 free parking spaces and no Pay and Display, residential permit, loading zones, or spaces designated for people with disabilities. Ward 47, with 16 blocks of the Ashland corridor within its borders, has 730 free spaces.

Ward Maps

The maps in Appendix A display free parking, Pay and Display parking, and residential permit parking on each block within the corridors. Loading zones and disabled parking are shown in the

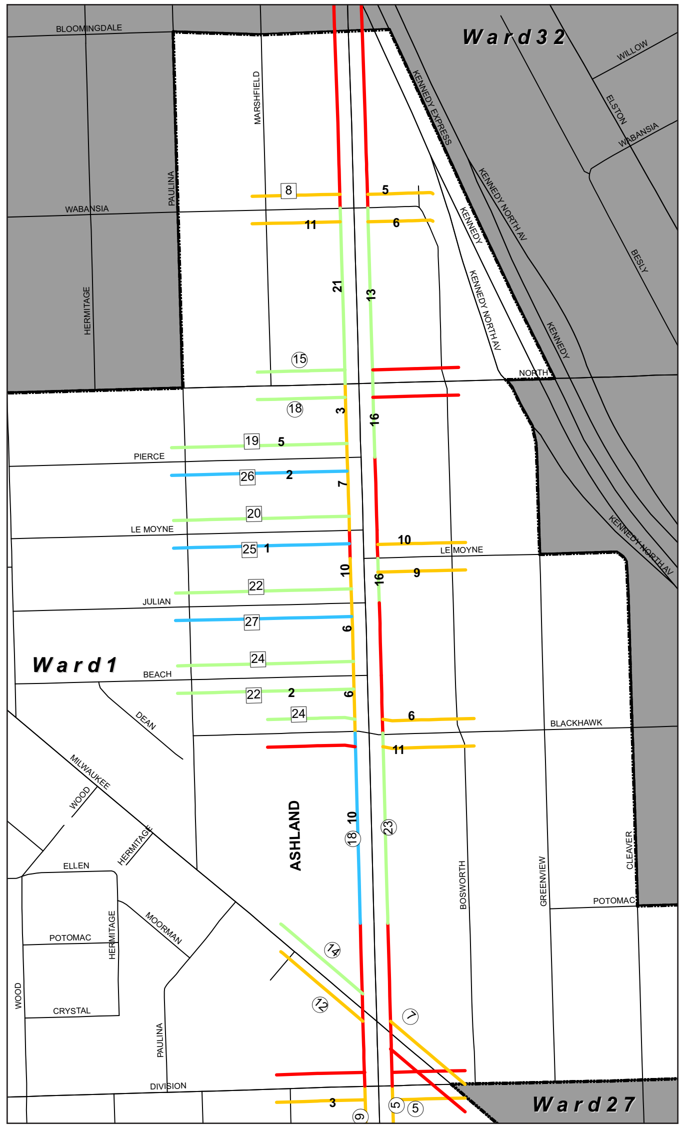
accompanying tables. Note that parking spaces at ward boundaries are shown in both wards. Therefore, because it is important to show parking spaces that are relevant to each alderman, there is double counting and the total of these tables indicates considerably more parking (35% more on Western, 22% on Ashland, and about 10% on the cross streets) than the actual totals given in the overview tables shown above. A typical data collection record is shown in Appendix B.

Parking Impacts

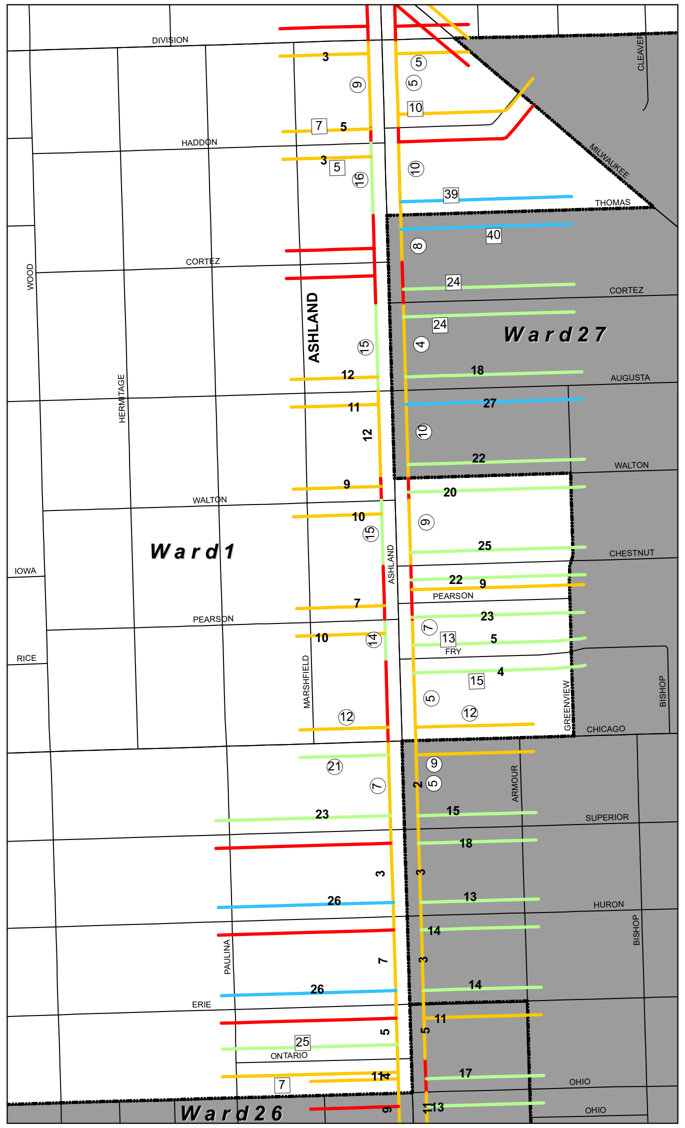
Having an inventory of existing parking is a critical first step in developing an understanding of how a BRT corridor could affect access in the neighborhoods. But it is ultimately a question of what the demand for parking is, and how the system is designed, that dictates how the available parking will be affected. Mitigations, if required, would depend on the space utilization. Thus, as a next step, we recommend a targeted utilization study to follow this inventory.

It should be noted that one of the key positive outcomes of implementing an effective BRT system is that demand for auto trips is reduced and replaced with demand for BRT trips. As demand for auto trips is reduced, so too is demand for parking; thus the BRT has the potential to reduce parking demand. With reduced parking demand, destination parking – such as that found along the Western and Ashland Corridors – could be reduced without negative impacts on the surrounding areas. These benefits can be best estimated once a set of BRT design alternatives has been proposed and actual parking demand determined.

Appendix A: Ward Maps



Ward 1, Ashland North (1 of 2)



Ward 1, Ashland South (2 of 2)

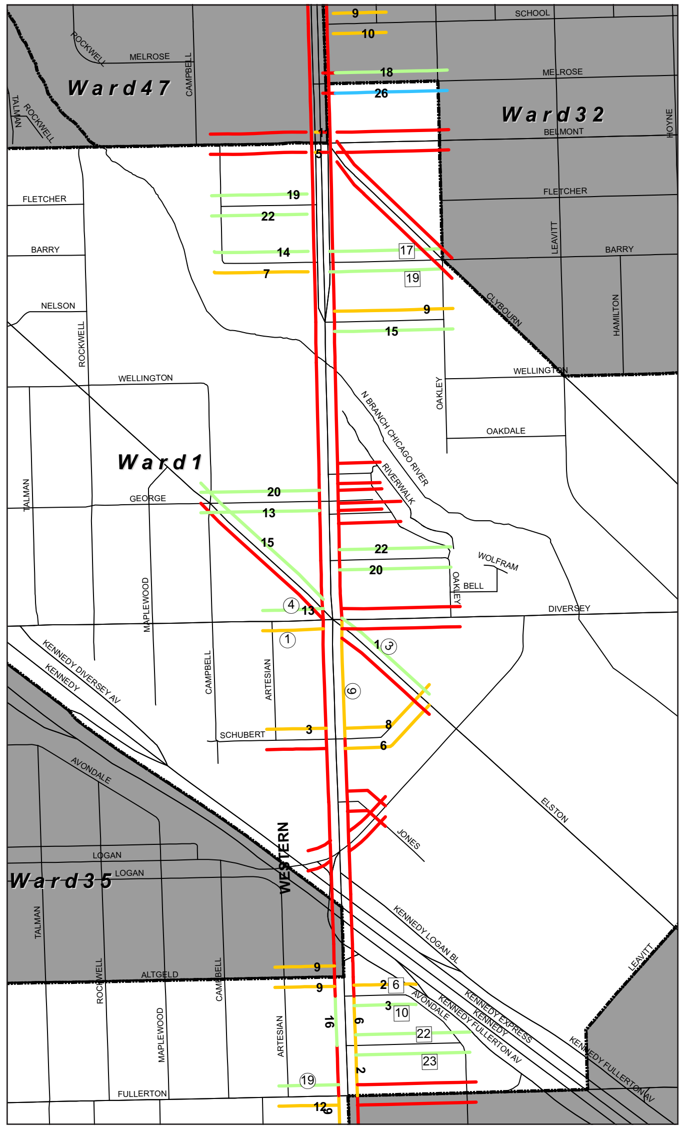
Ward 1

Both corridors traverse Ward 1 which shares streets with Wards 26, 32, 35 and 47. There are 31 off-street lots in Ward 1 that could potentially become shared parking.

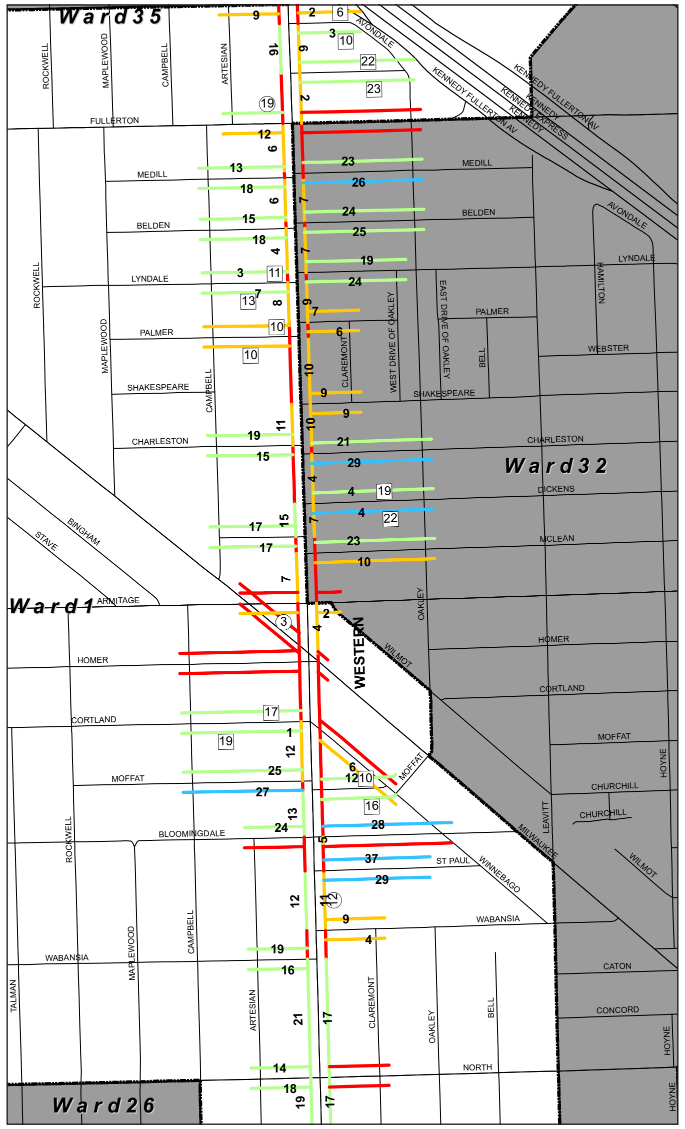
LEGEND

Range of Total Parking per Block Side		Number Parking Spaces by Type*	
🟥	0	#	Free Parking
🟨	1–12	(#)	P&D Spaces
🟩	13–25	[#]	Permit Spaces
🟦	26–50		
🟦	50+		

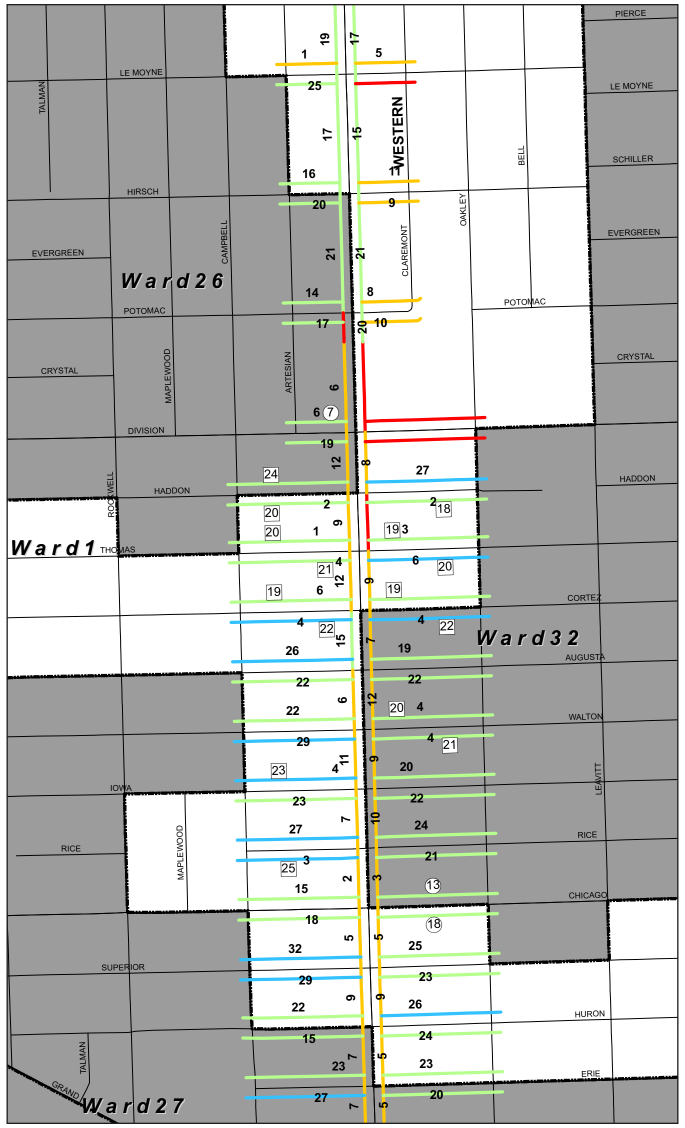
*Exact location on block not recorded



Ward 1, Western (1 of 3)

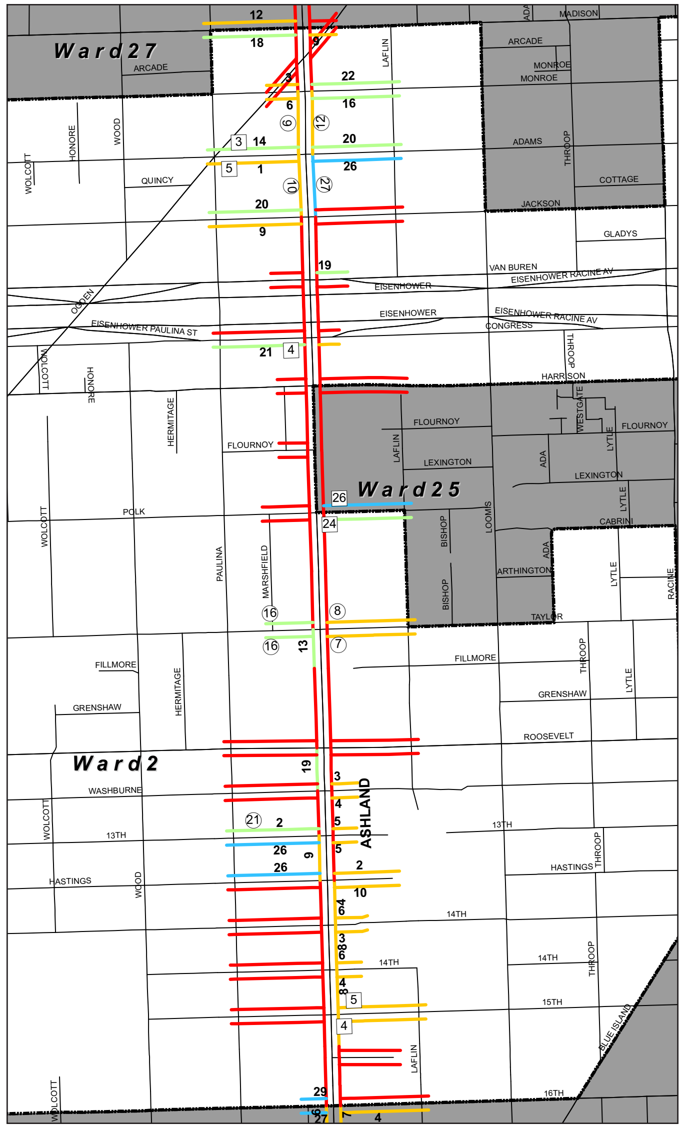


Ward 1, Western (2 of 3)

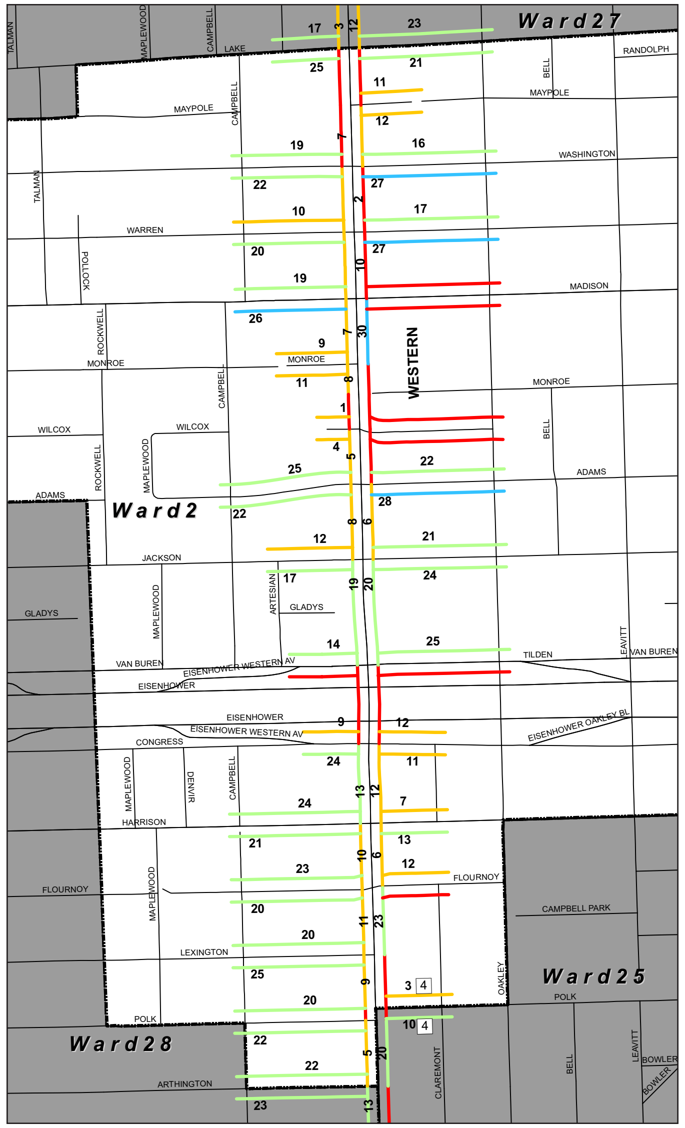


Ward 1, Western (3 of 3)

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	610	21	0	37	0
Cross Streets	1289	58	475	29	5
Ashland	152	180	0	30	0
Cross Streets	347	125	378	18	7



Ward 2, Ashland



Ward 2, Western

Ward 2

Both corridors traverse Ward 2 which shares streets with Wards 25, 26, and 28. There are 7 off-street lots in Ward 2 that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

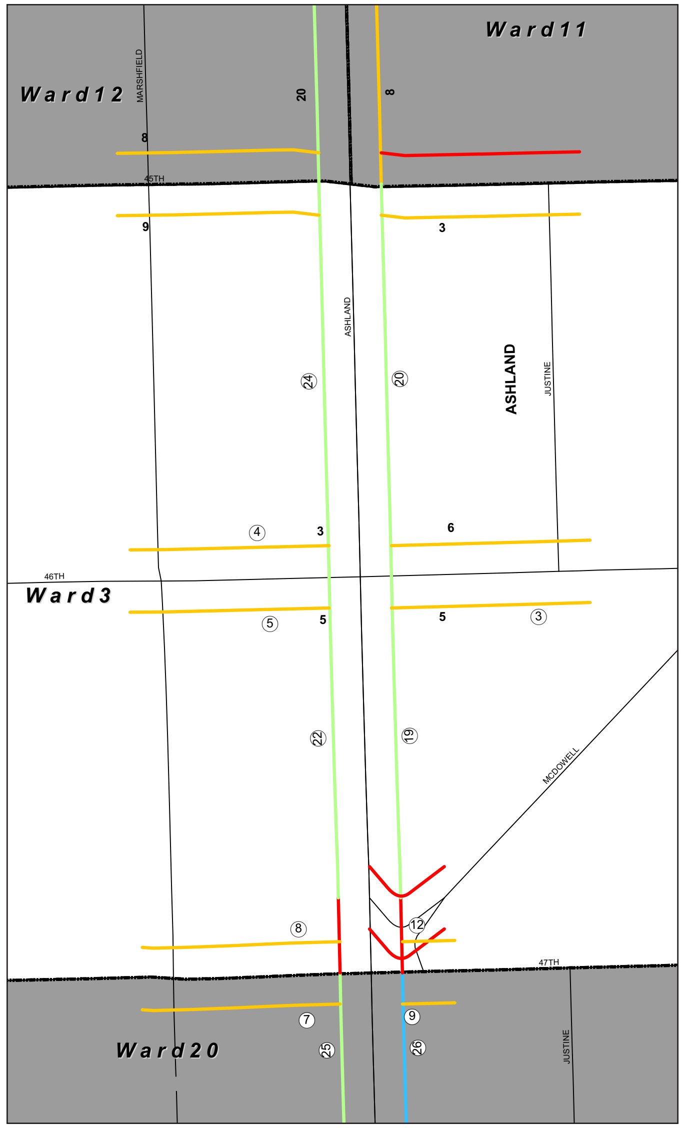
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*

#	Free Parking
ⓝ	P&D Spaces
☐	Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	234	0	0	3	0
Cross Streets	868	0	8	0	3
Ashland	64	55	0	10	0
Cross Streets	378	68	71	3	5



Ward 3

Ward 3

Only the Ashland Corridor traverses Ward 3 which shares streets with Wards 11, 12, and 20. There are no off-street lots in Ward 3 that could potentially become shared parking.

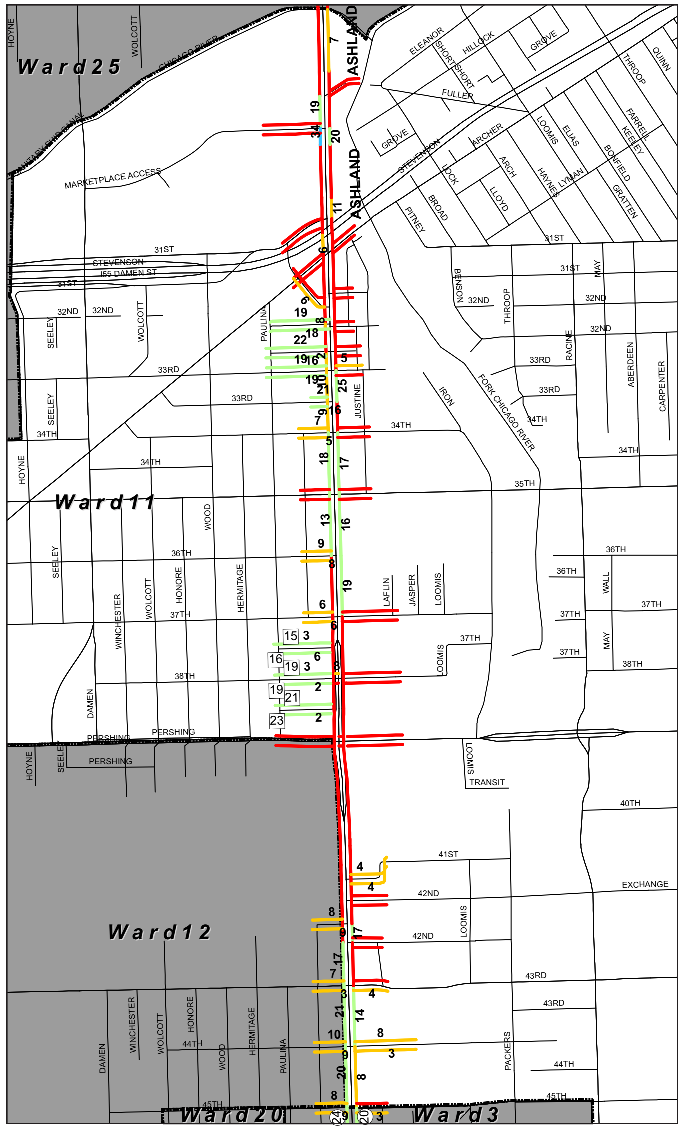
LEGEND

Range of Total Parking per Block Side
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*
# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland	0	85	0	1	0
Cross Streets	39	48	0	4	0



Ward 11

Ward 11

Only the Ashland Corridor traverses Ward 11 which shares streets with Wards 3, 12, and 25. Ward 11 is bounded on the west by Western Boulevard, but does not reach to Western Avenue. There are 15 off-street lots in Ward 11 that could potentially become shared parking.

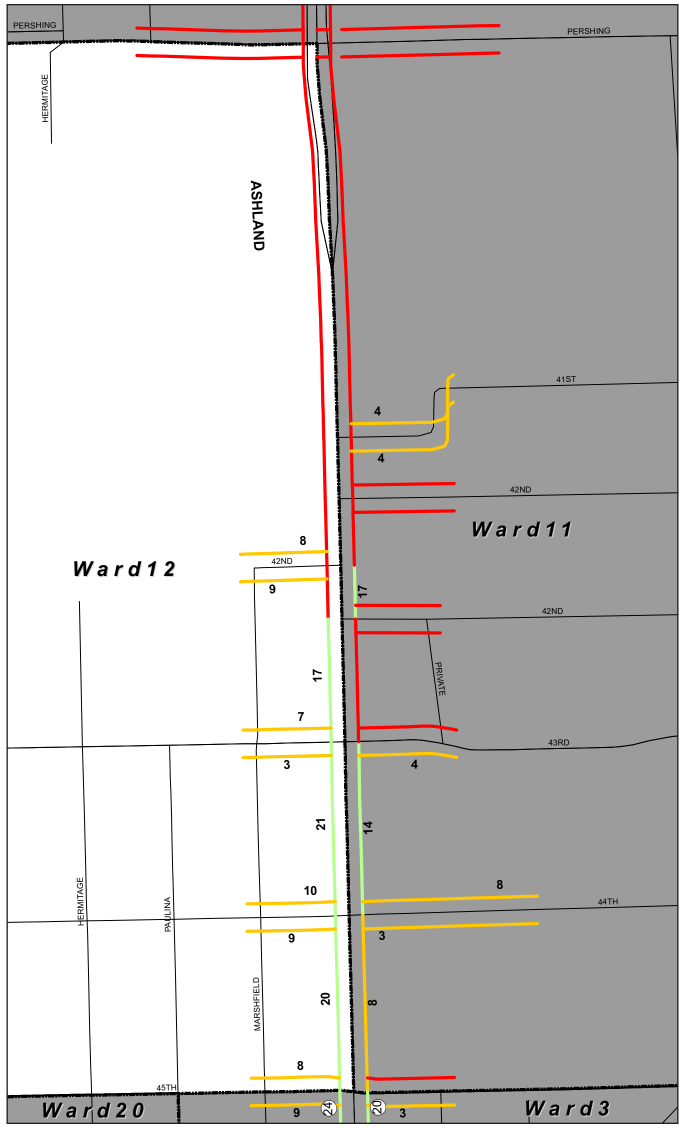
LEGEND

Range of Total Parking per Block Side
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*
# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland	334	0	0	2	0
Cross Streets	252	0	113	0	14



Ward 12, Ashland

Ward 12

Both corridors traverse Ward 12 which also shares streets with Wards 3, 11, 14, and 16. There are 10 off-street lots in Ward 12 that could potentially become shared parking.

LEGEND

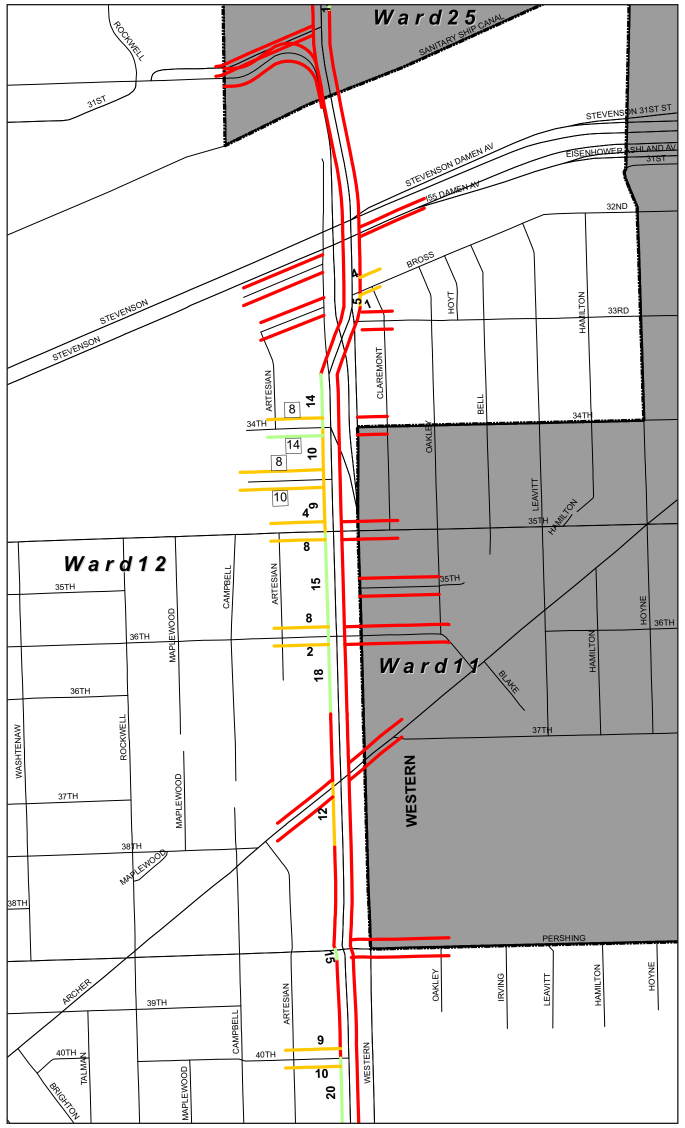
Range of Total Parking per Block Side

- 🟥 0
- 🟨 1–12
- 🟩 13–25
- 🟦 26–50
- 🟦 50+

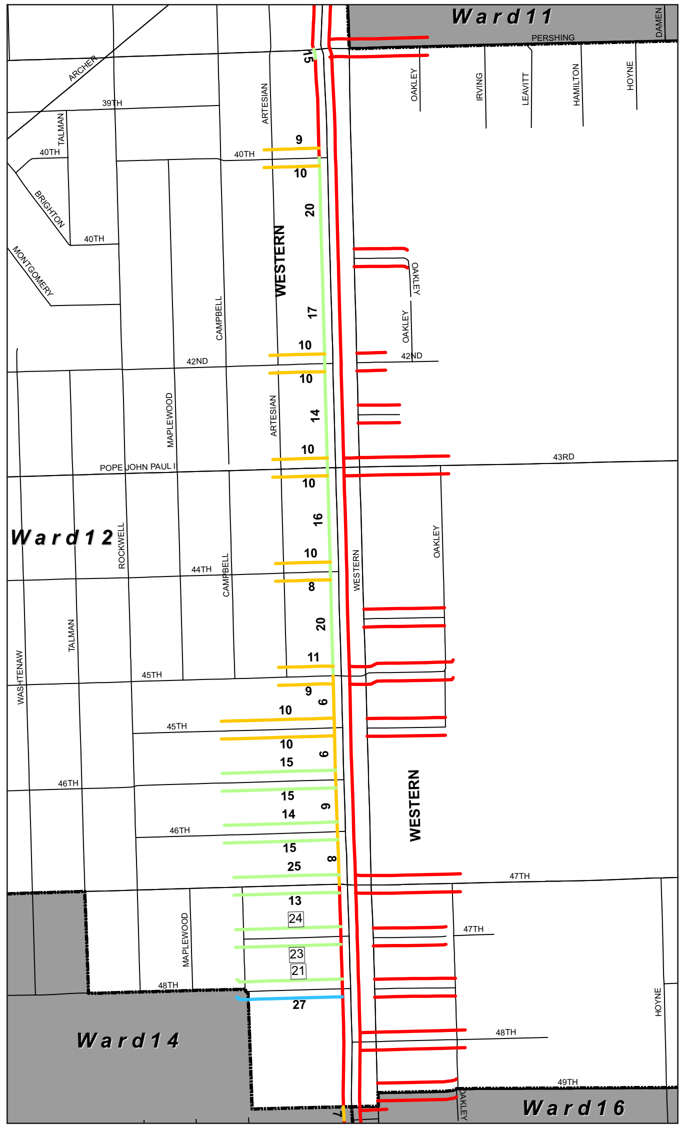
Number Parking Spaces by Type*

- # Free Parking
- (#) P&D Spaces
- [#] Permit Spaces

*Exact location on block not recorded

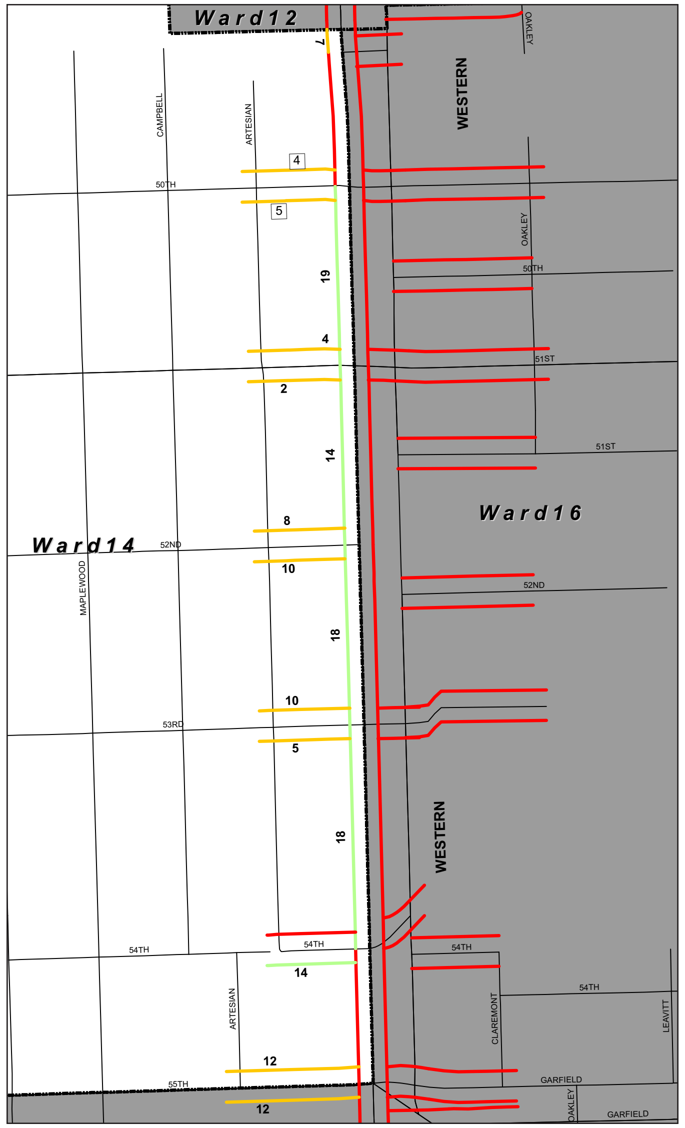


Ward 12, Western North



Ward 12, Western South

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	216	0	0	2	0
Cross Streets	268	0	108	0	3
Ashland	97	0	0	0	0
Cross Streets	63	0	0	2	1



Ward 14

Ward 14

There are 10 off-street lots in Ward 14 that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

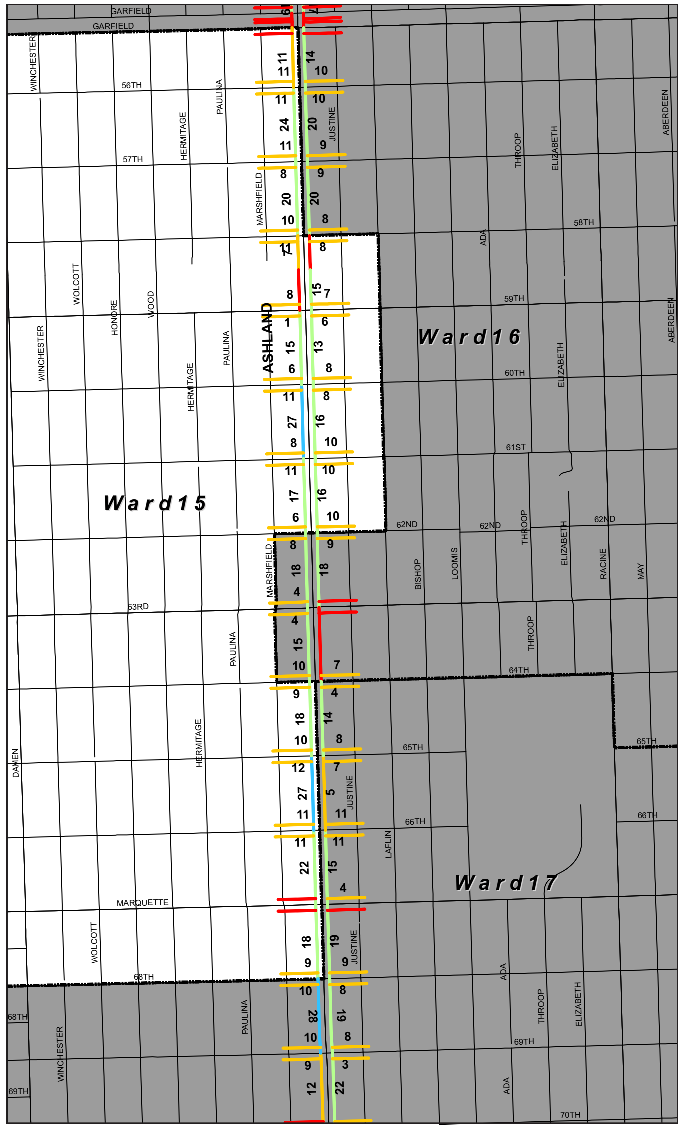
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*

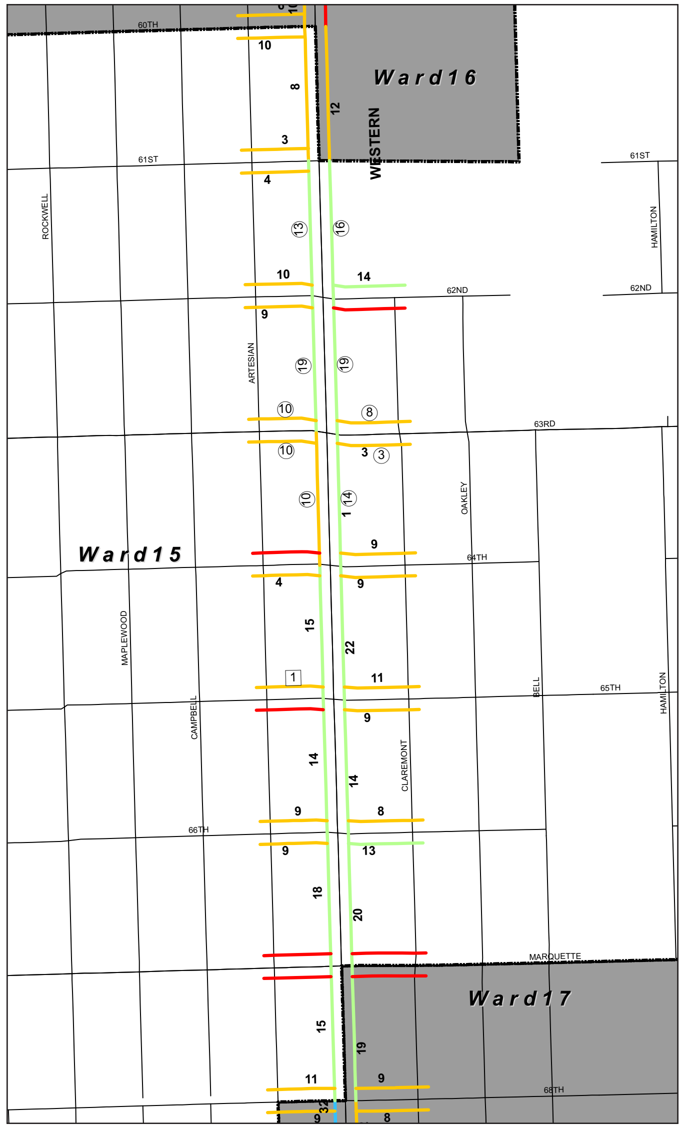
# Free Parking
(#) P&D Spaces
☐# Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	76	0	0	0	0
Cross Streets	77	0	9	0	0



Ward 15, Ashland



Ward 15, Western

Ward 15

There are 11 off-street lots in Ward 15 that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

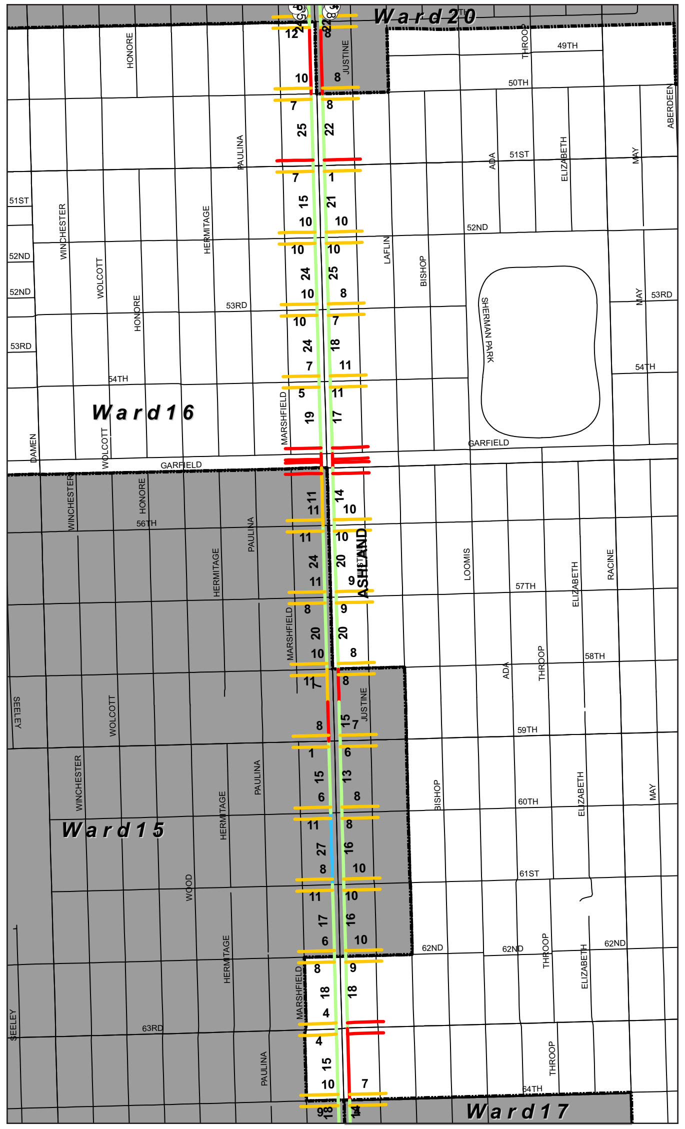
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*

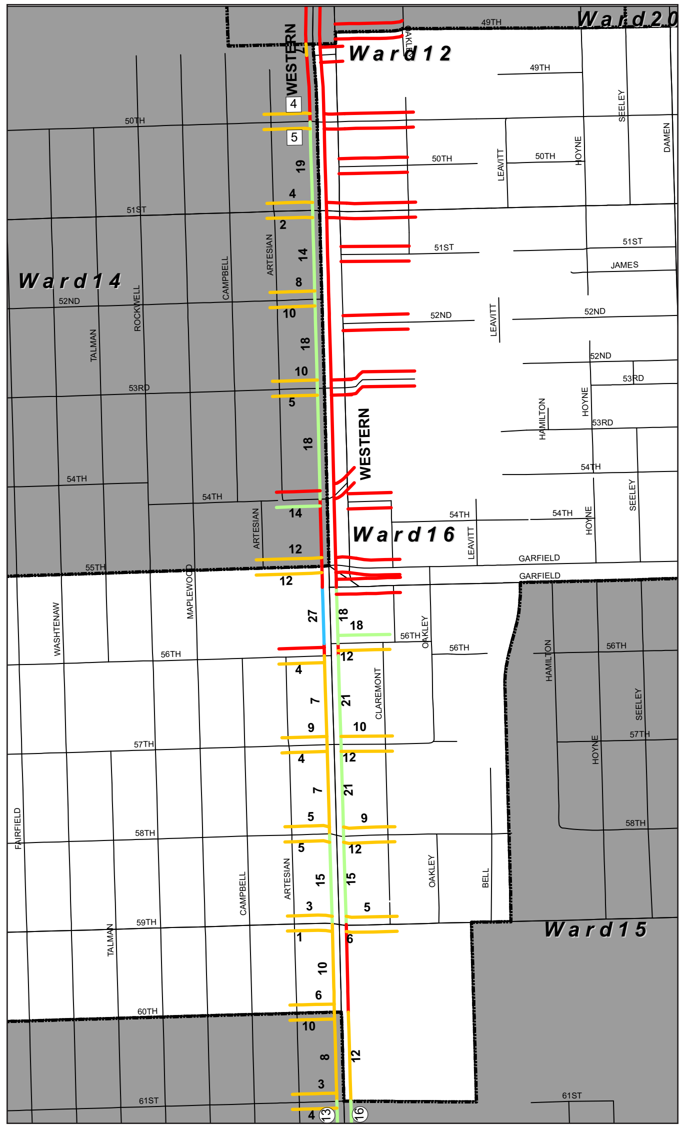
# Free Parking
(#) P&D Spaces
☐# Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	171	91	0	13	0
Cross Streets	162	31	1	0	0
Ashland	373	0	0	2	0
Cross Streets	287	0	0	3	0



Ward 16, Ashland



Ward 16, Western

Ward 16

There are 24 off-street lots in Ward 16 that could potentially become shared parking.

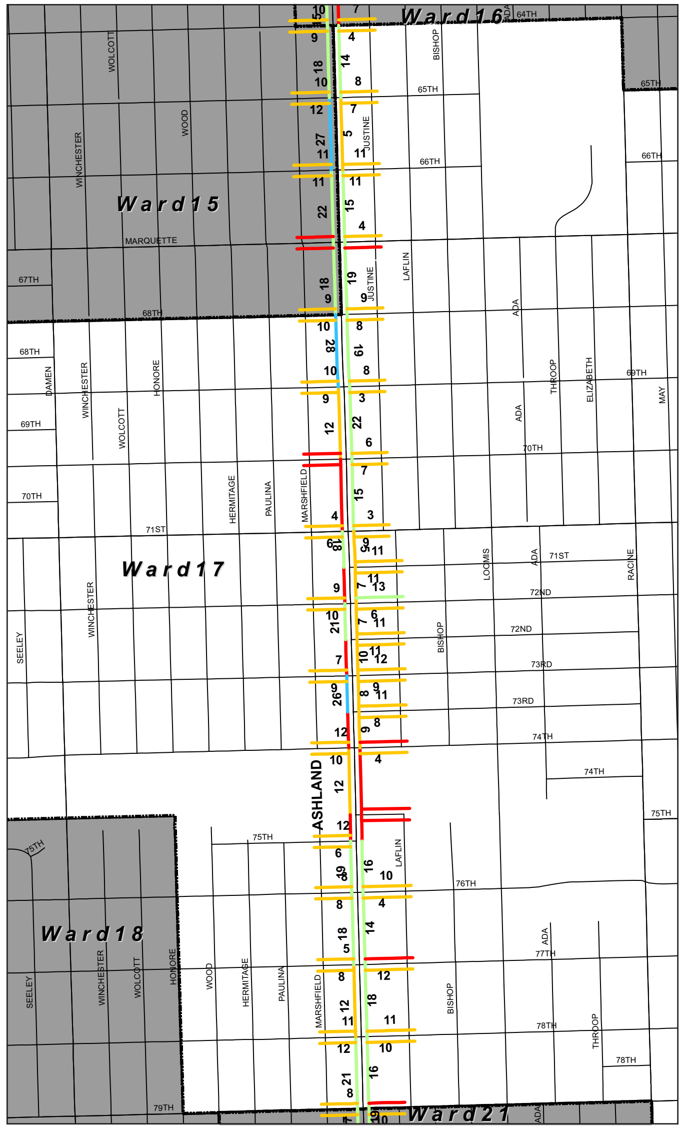
LEGEND

Range of Total Parking per Block Side
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

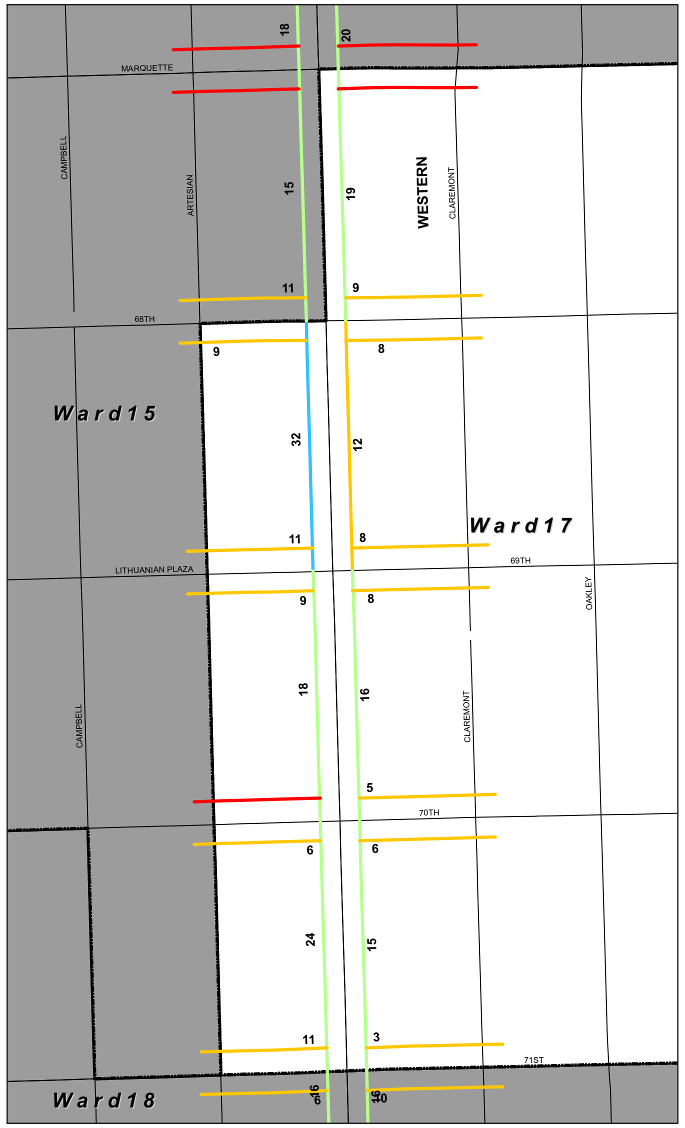
Number Parking Spaces by Type*
# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	237	0	0	0	0
Cross Streets	155	0	0	0	0
Ashland	416	0	0	0	0
Cross Streets	293	4	0	2	0



Ward 17, Ashland



Ward 17, Western

Ward 17

There are 15 off-street lots in Ward 17 that could potentially become shared parking.

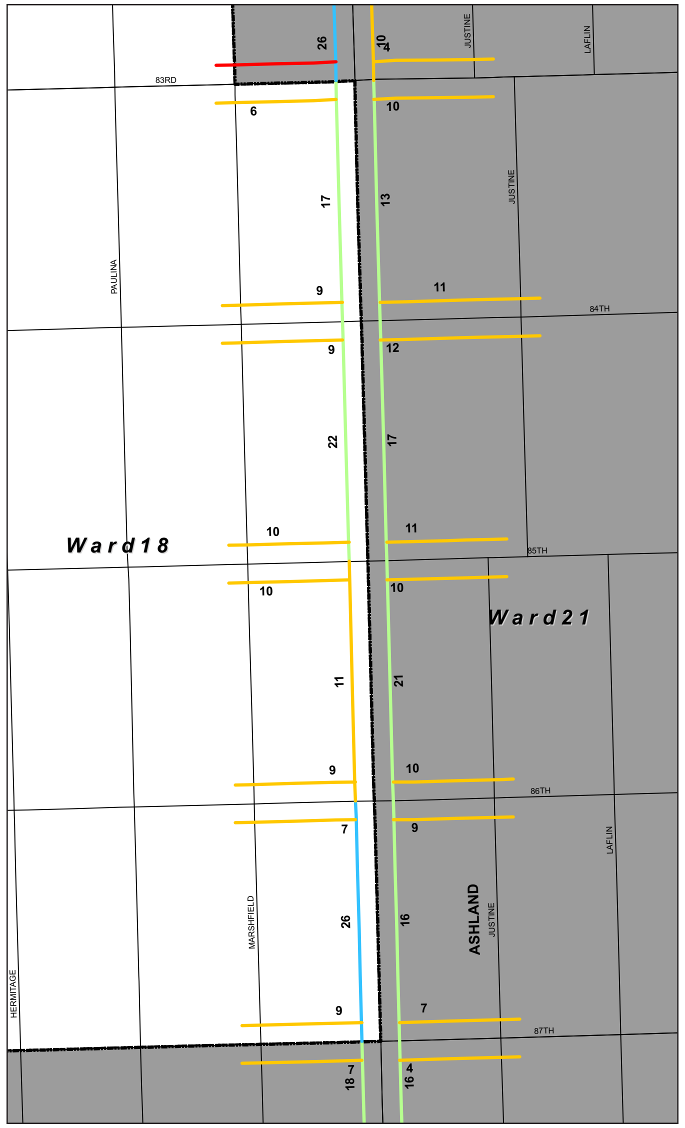
LEGEND

Range of Total Parking per Block Side
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

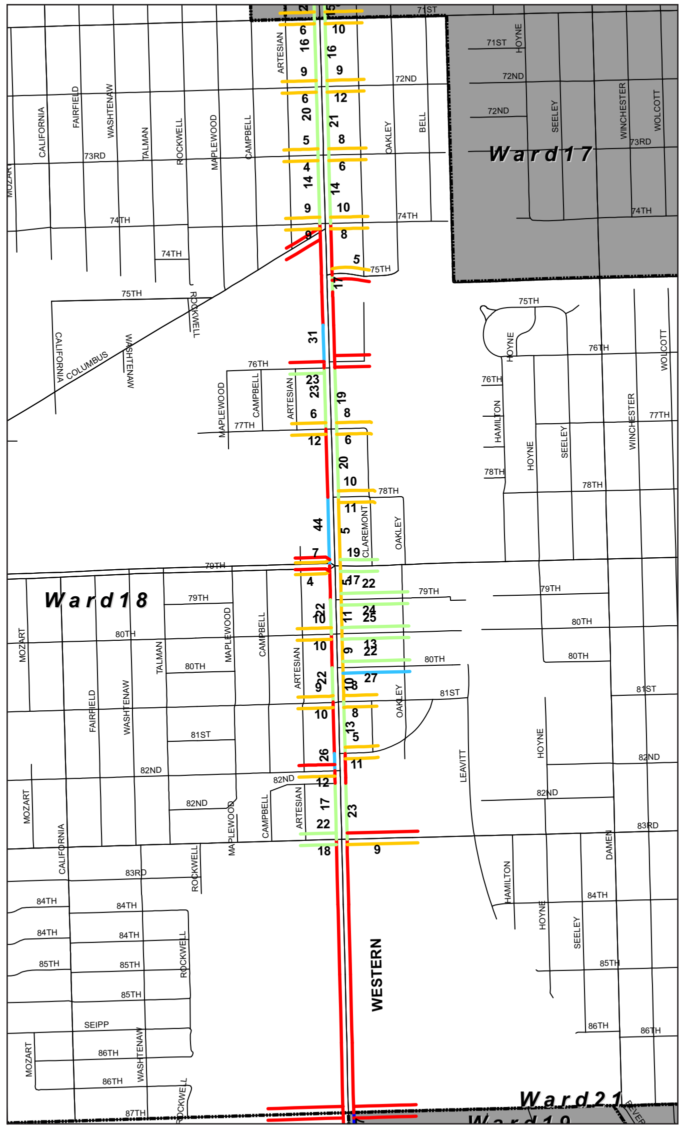
Number Parking Spaces by Type*
# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	151	0	0	0	0
Cross Streets	120	0	0	0	0
Ashland	491	0	0	3	0
Cross Streets	453	0	0	2	5



Ward 18, Ashland



Ward 18, Western

Ward 18

There are 41 off-street lots in Ward 18 that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

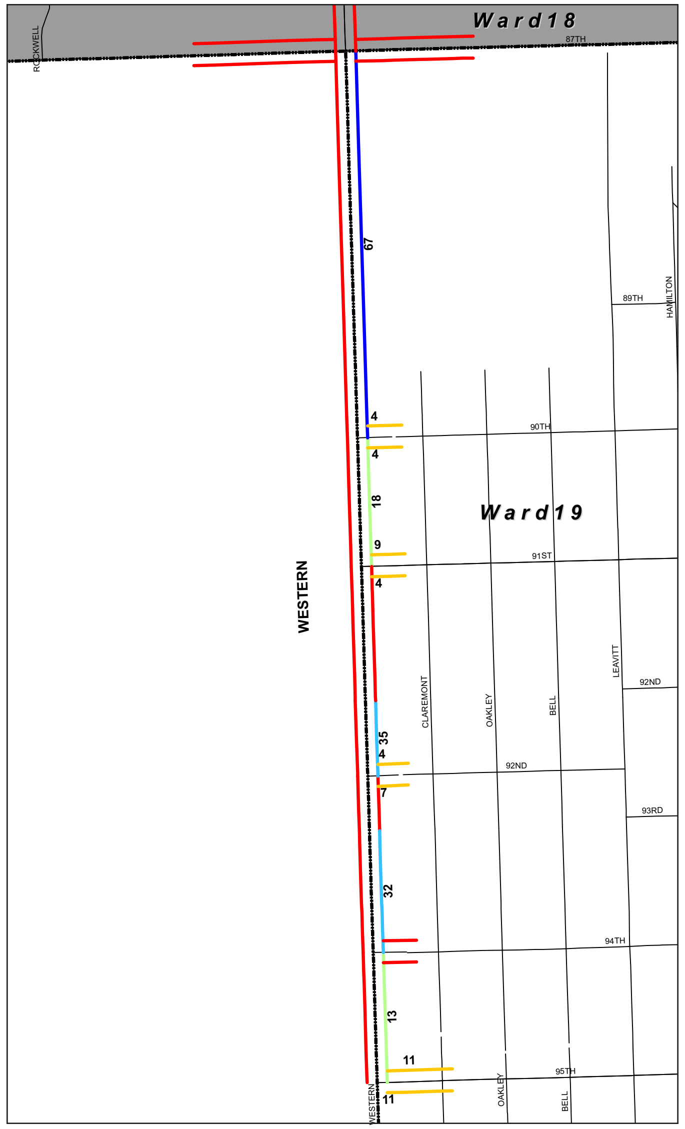
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*

# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	418	0	0	0	0
Cross Streets	518	0	0	0	3
Ashland	143	0	0	2	0
Cross Streets	76	0	0	0	0



Ward 19

Ward 19

There are 11 off-street lots in Ward 19 that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

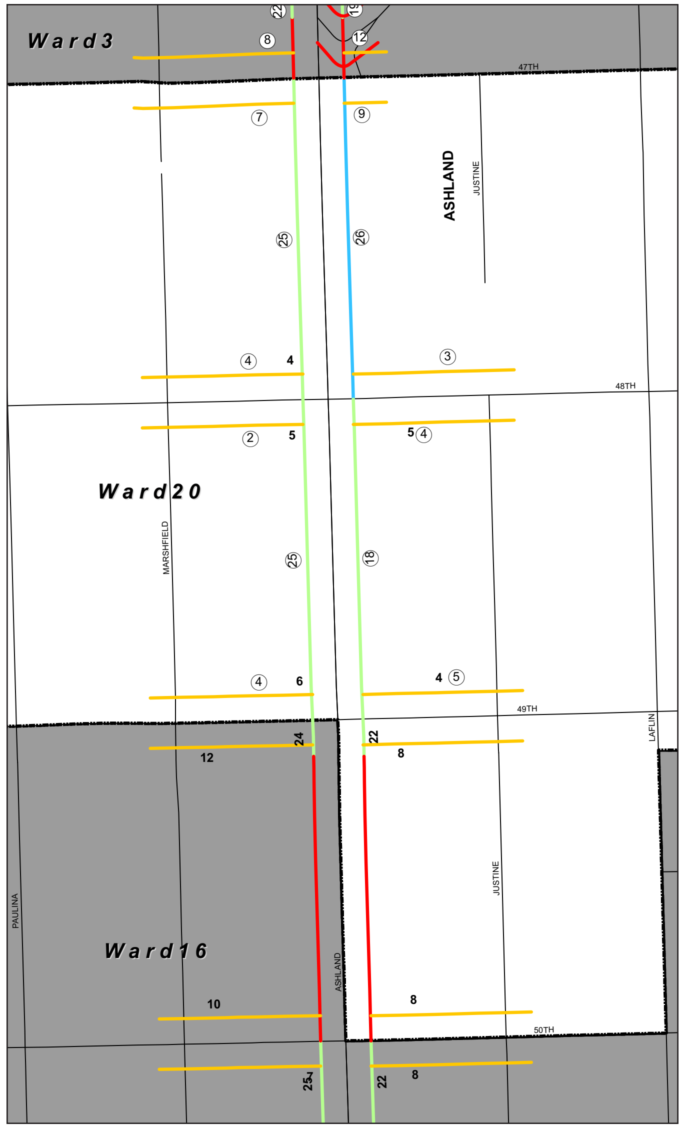
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*

# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	165	0	0	0	0
Cross Streets	54	0	0	0	0



Ward 20

Ward 20

There is 1 off-street lot in Ward 20 that could potentially become shared parking.

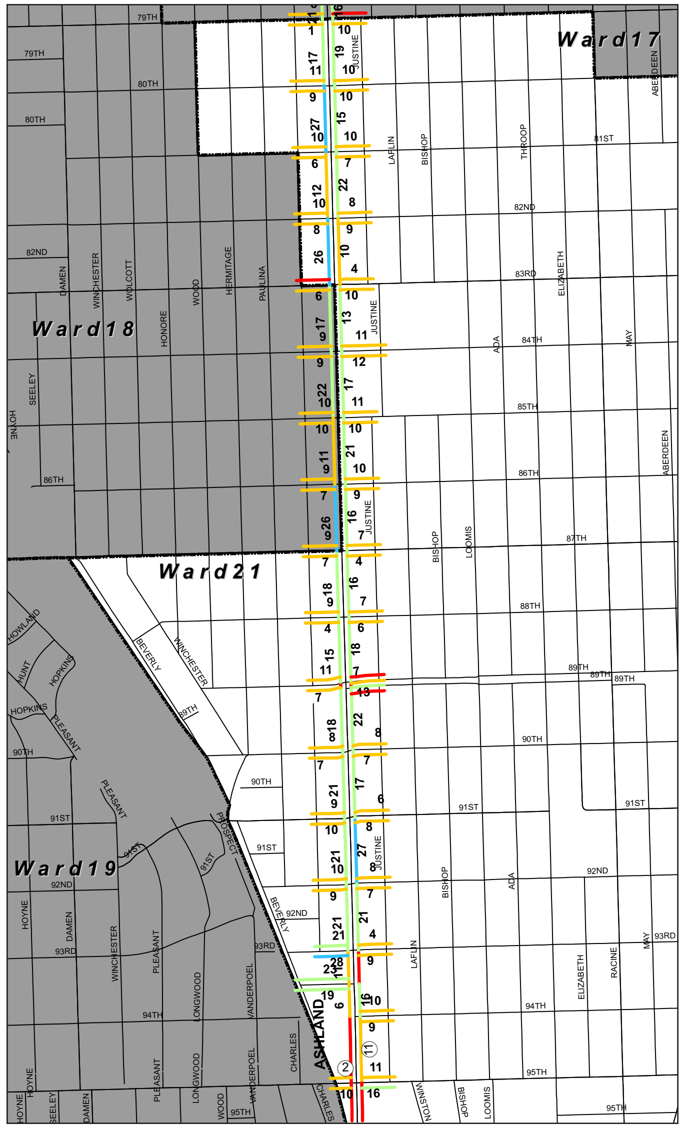
LEGEND

Range of Total Parking per Block Side
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*
# Free Parking
Ⓣ P&D Spaces
▢ Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland	46	94	0	0	0
Cross Streets	60	58	0	0	0



Ward 21

Ward 21

There are 19 off-street lots in Ward 21 that could potentially become shared parking.

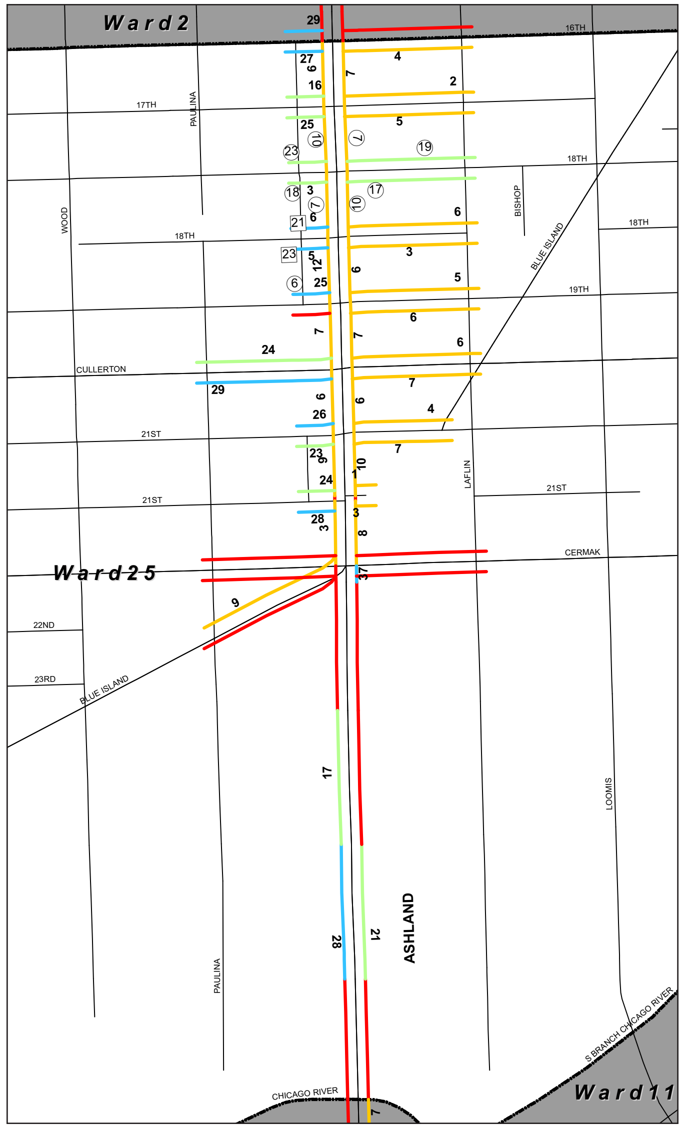
LEGEND

Range of Total Parking per Block Side
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*
# Free Parking
Ⓣ P&D Spaces
▢ Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland	559	11	0	3	0
Cross Streets	558	2	0	1	4



Ward 25, Ashland

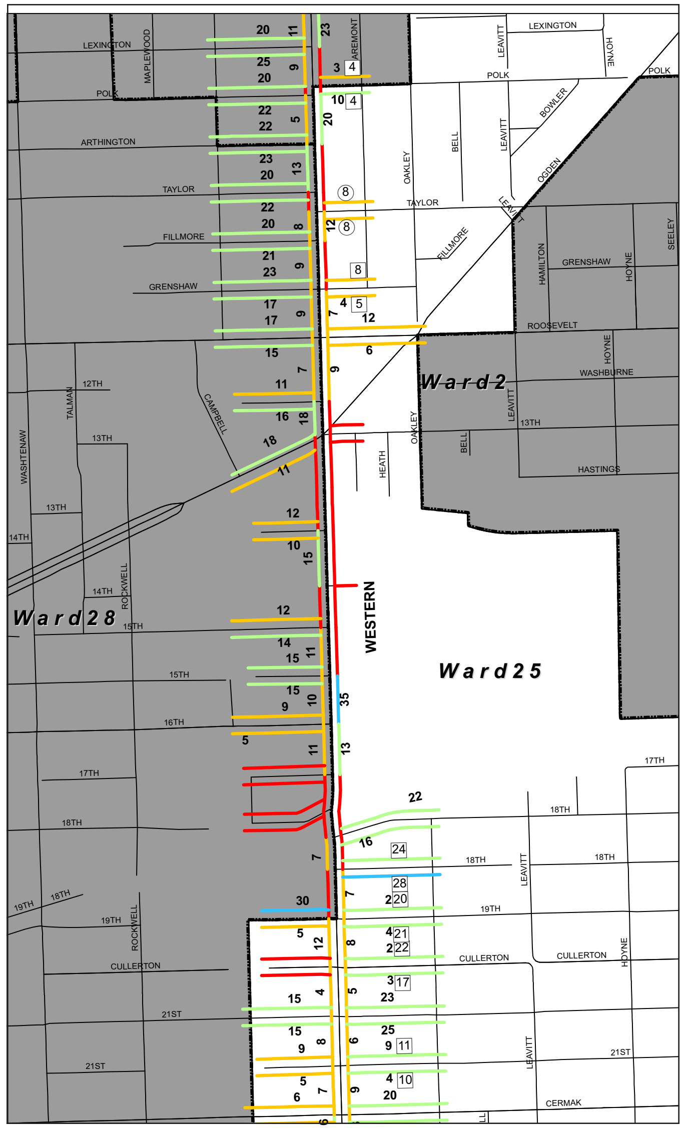
Ward 25

There are 17 off-street lots in Ward 25 that could potentially become shared parking.

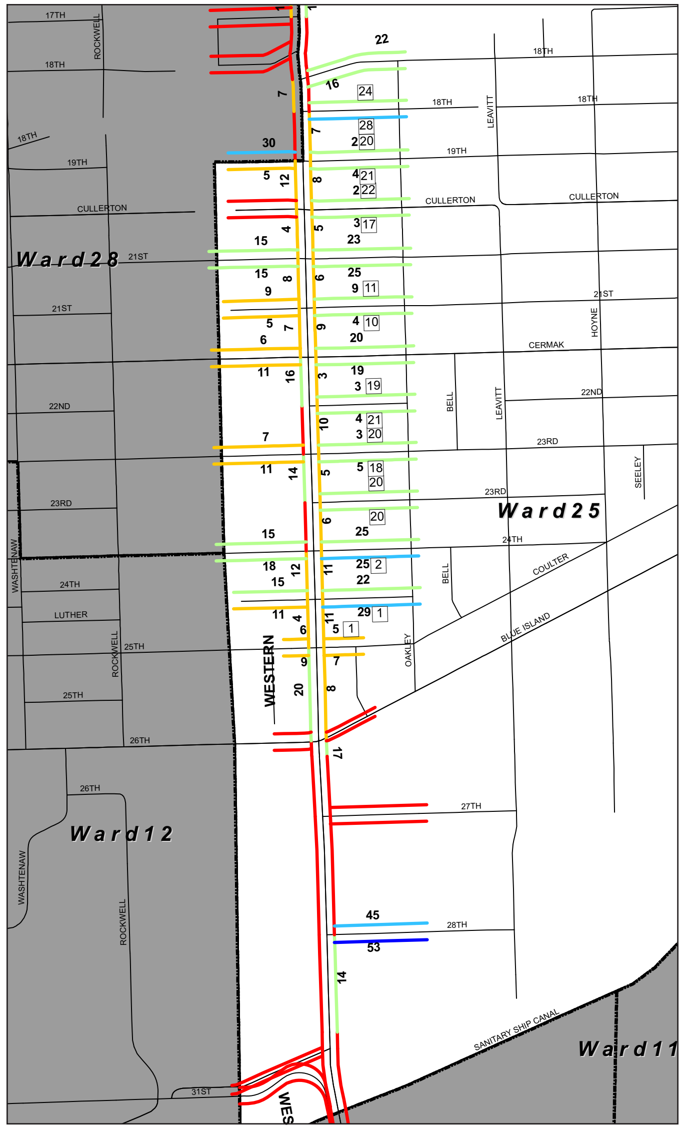
LEGEND

Range of Total Parking per Block Side		Number Parking Spaces by Type*	
🟥	0	#	Free Parking
🟨	1–12	⑧	P&D Spaces
🟩	13–25	☐	Permit Spaces
🟦	26–50		
🟦	50+		

*Exact location on block not recorded

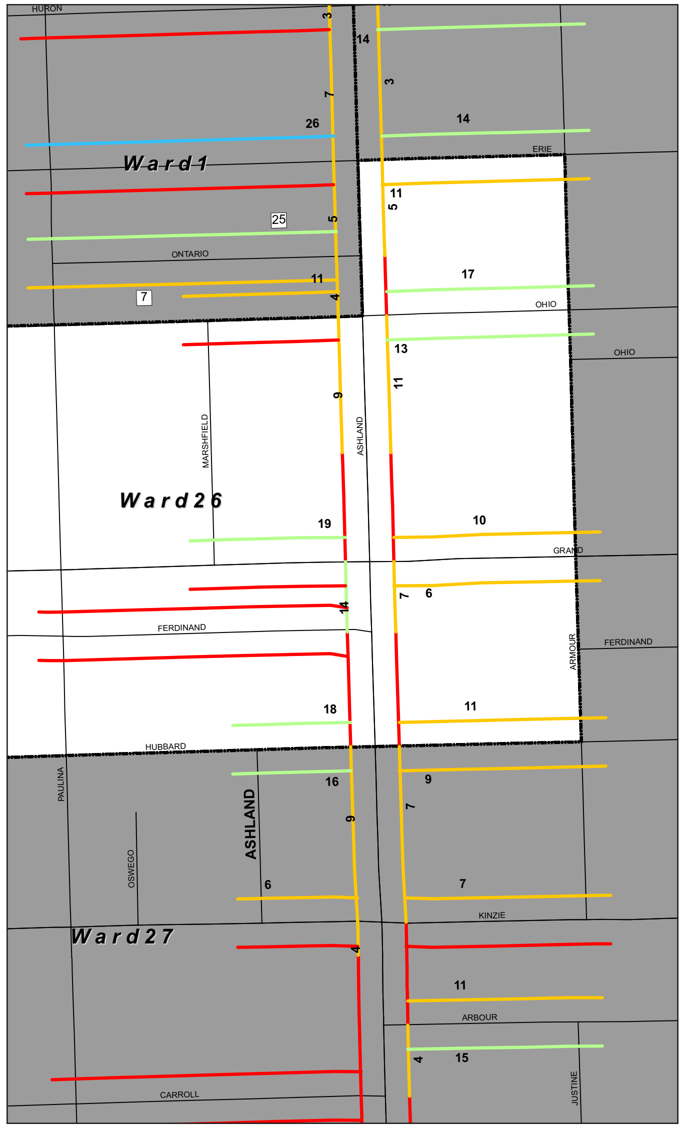


Ward 25, Western North

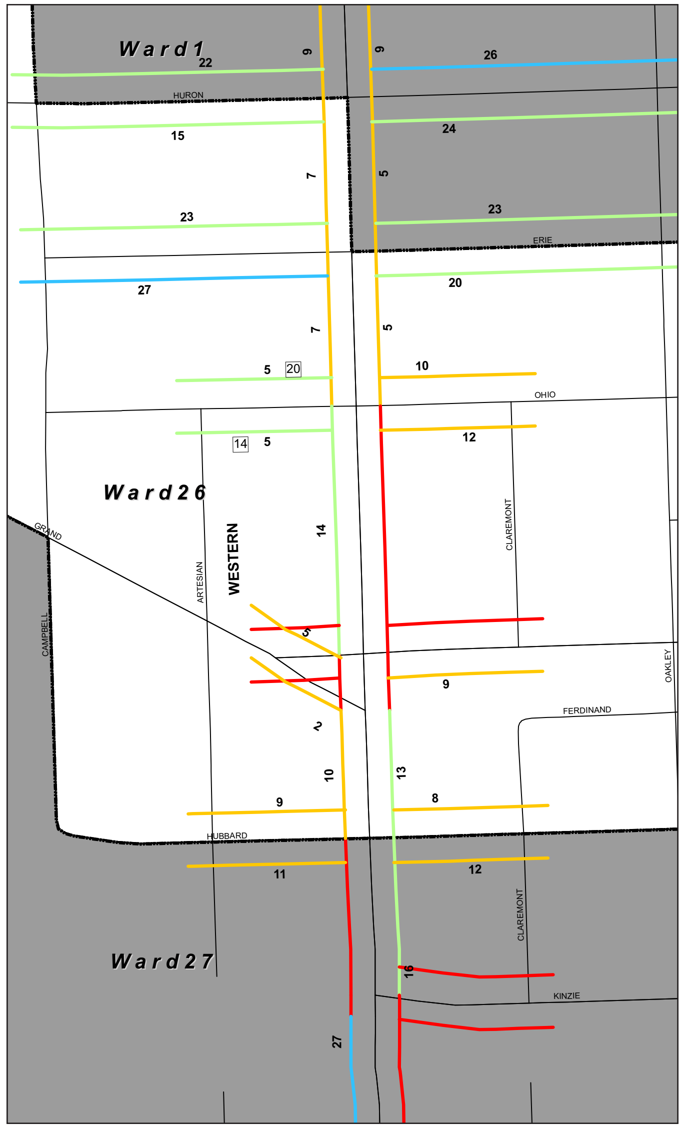


Ward 25, Western South

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	438	0	0	2	0
Cross Streets	598	16	296	3	3
Ashland	190	34	0	5	0
Cross Streets	358	83	94	11	1



Ward 26, Ashland



Ward 26, Western

Ward 26

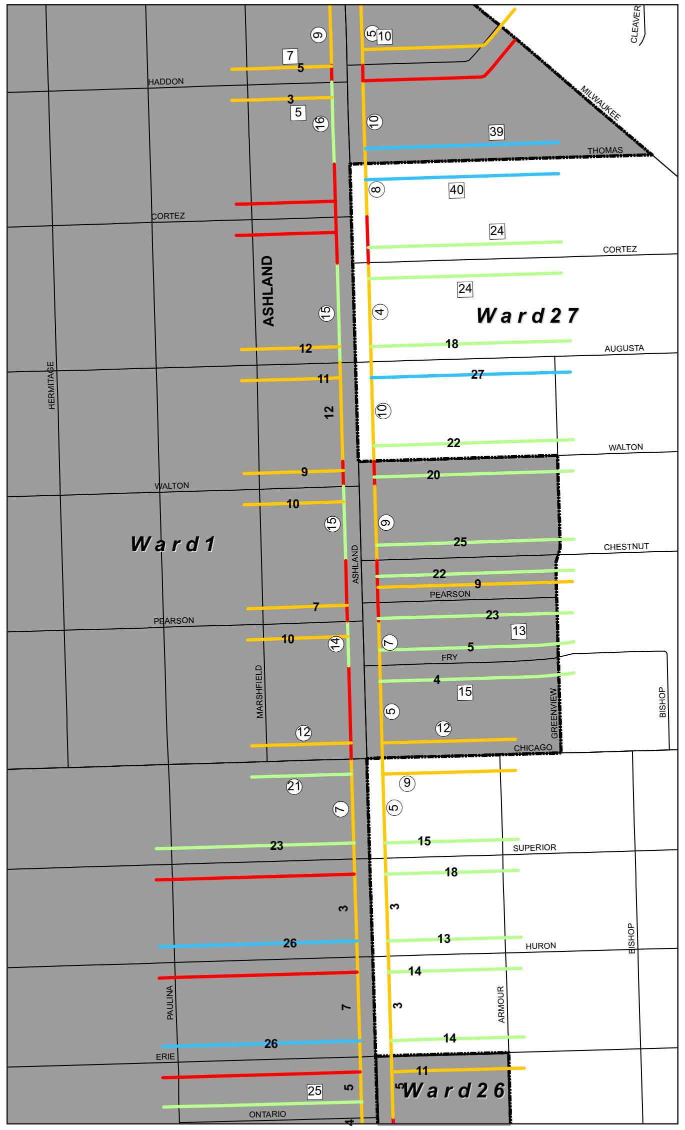
There are 6 off-street lots in Ward 26 that could potentially become shared parking.

LEGEND

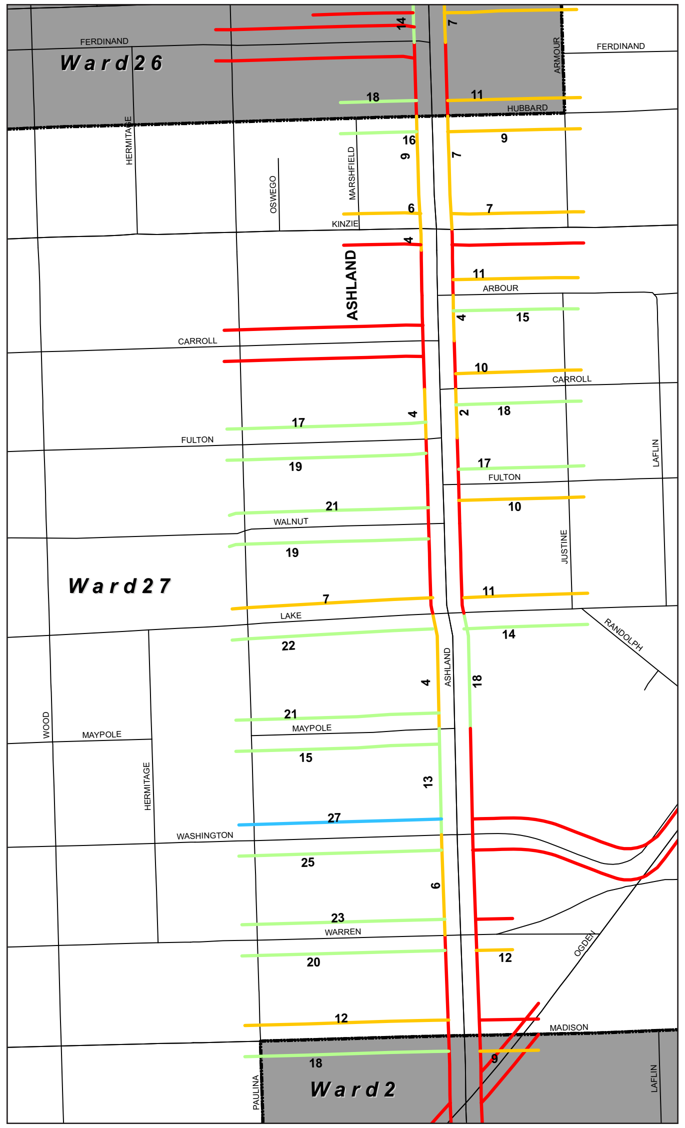
Range of Total Parking per Block Side	Number Parking Spaces by Type*	
🟥 0	#	Free Parking
🟨 1–12	(#)	P&D Spaces
🟩 13–25	[#]	Permit Spaces
🟦 26–50		
🟦 50+		

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	154	0	0	5	0
Cross Streets	312	7	78	6	2
Ashland	55	0	0	0	0
Cross Streets	155	0	0	0	3



Ward 27, Ashland North



Ward 27, Ashland South

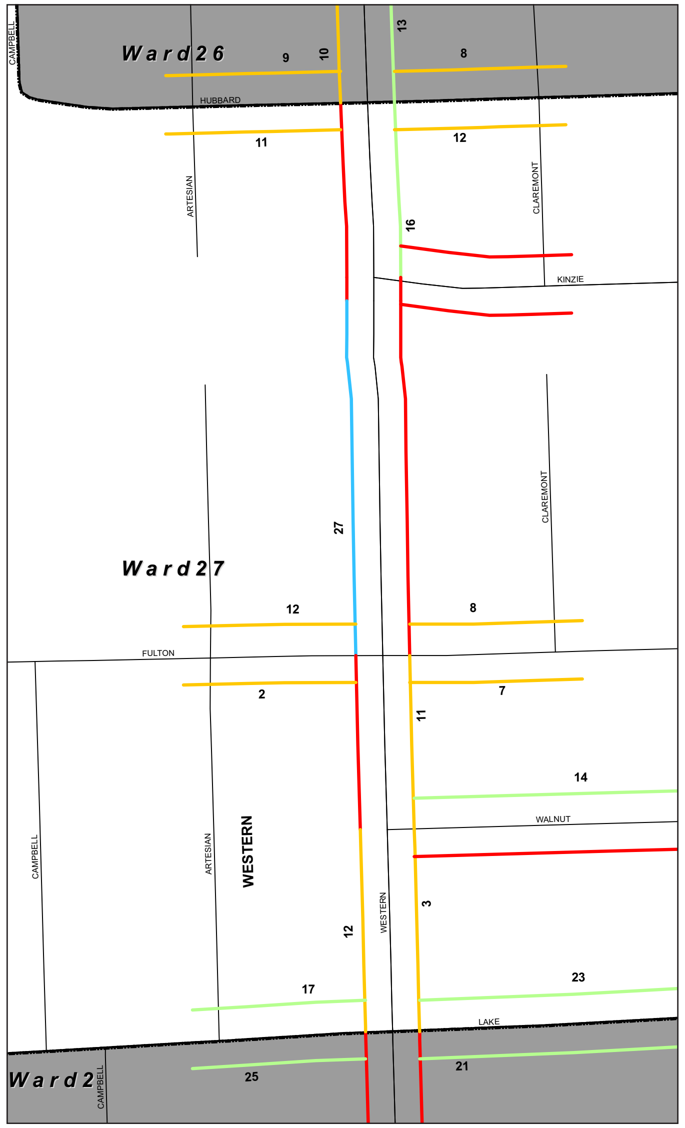
Ward 27

There are no off-street lots in Ward 27 that could potentially become shared parking.

LEGEND

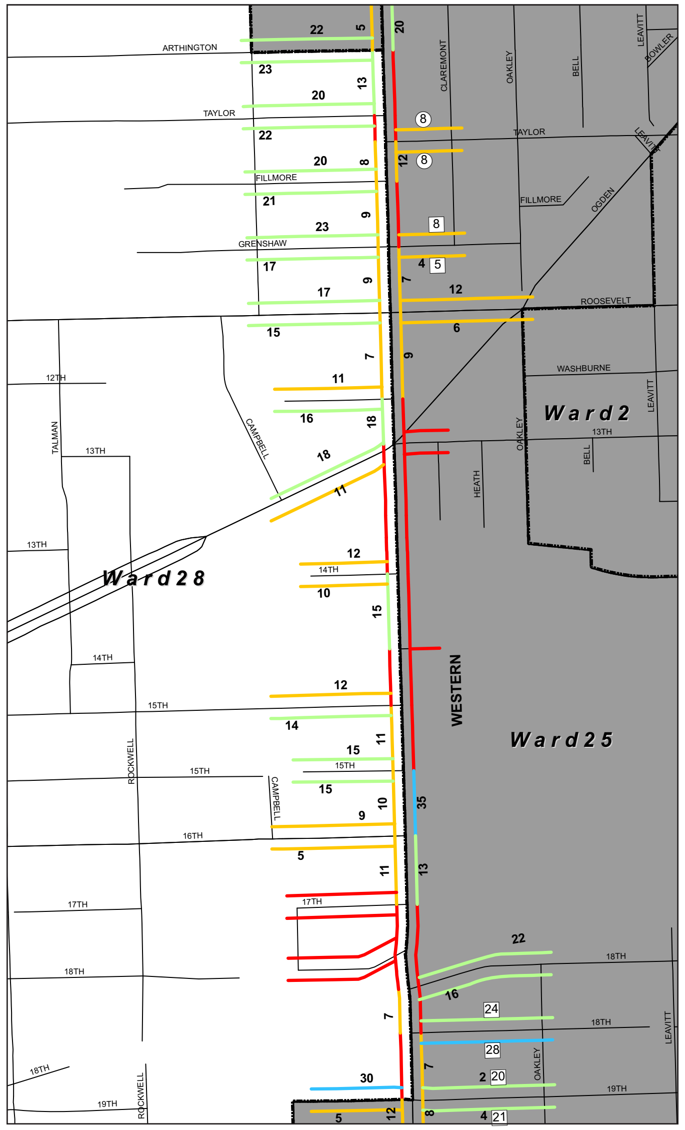
Range of Total Parking per Block Side	Number Parking Spaces by Type*	
🟥 0	#	Free Parking
🟨 1–12	(#)	P&D Spaces
🟩 13–25	[#]	Permit Spaces
🟦 26–50		
🟦 50+		

*Exact location on block not recorded



Ward 27, Western

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	69	0	0	0	0
Cross Streets	169	0	0	1	0
Ashland	104	49	0	16	0
Cross Streets	632	21	127	7	7



Ward 28

Ward 28

There are 7 off-street lots in Ward 28 that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

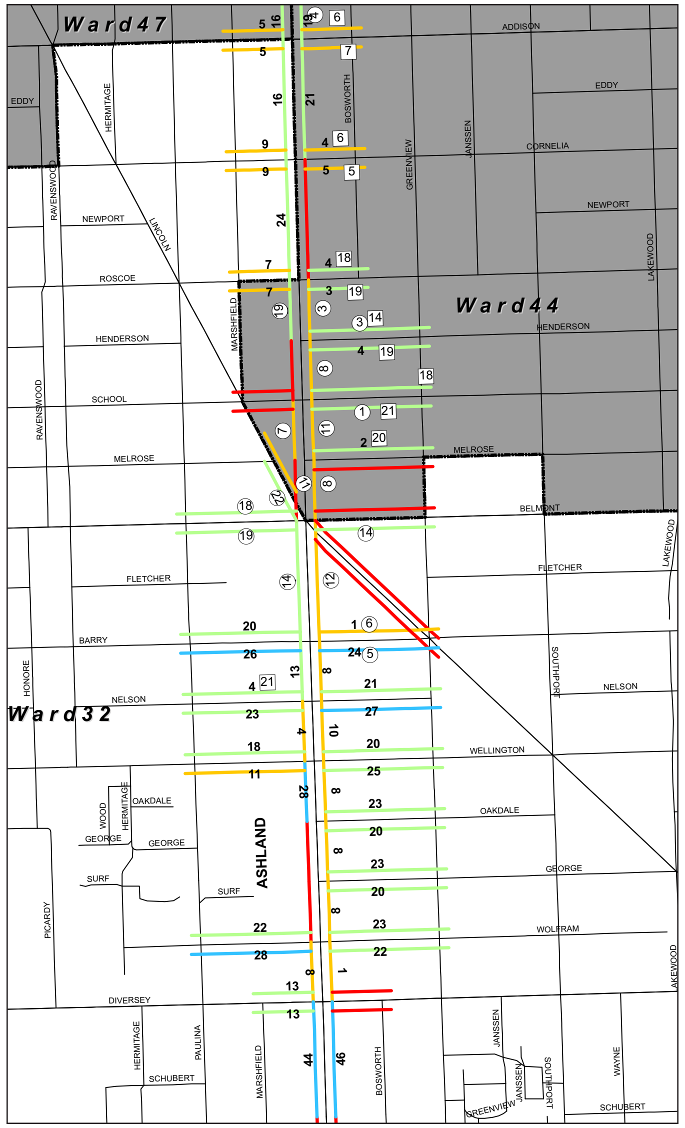
- 🟥 0
- 🟨 1–12
- 🟩 13–25
- 🟦 26–50
- 🟦 50+

Number Parking Spaces by Type*

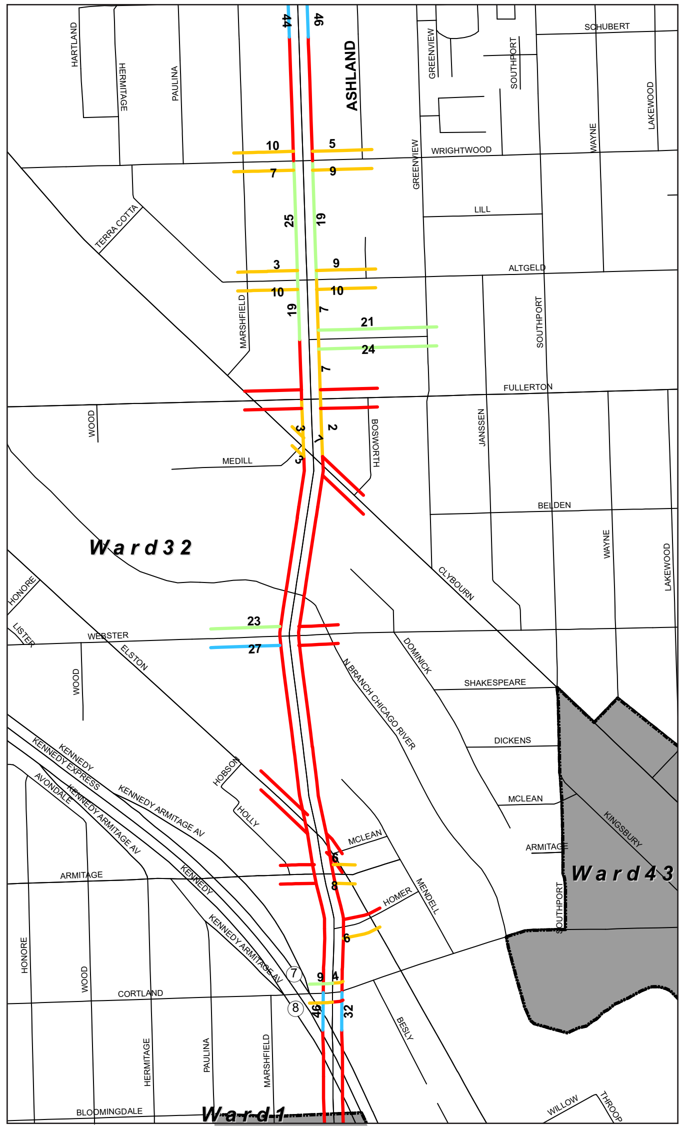
#	Free Parking
(#)	P&D Spaces
[#]	Permit Spaces

*Exact location on block not recorded

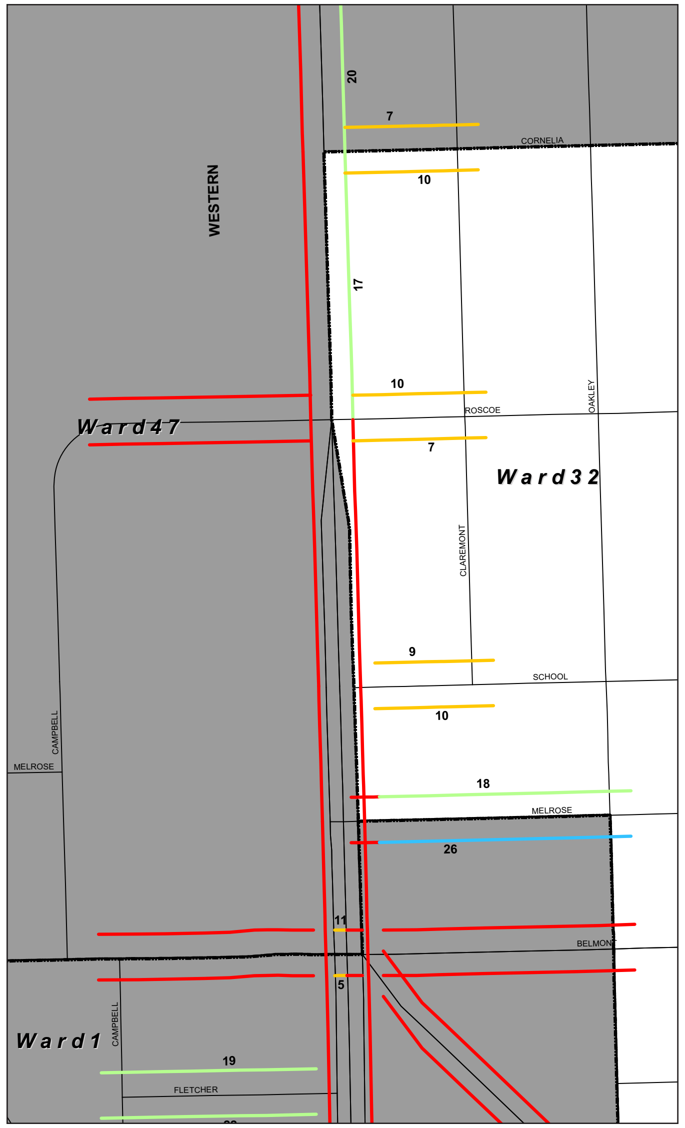
	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	177	0	0	0	0
Cross Streets	383	0	0	0	4



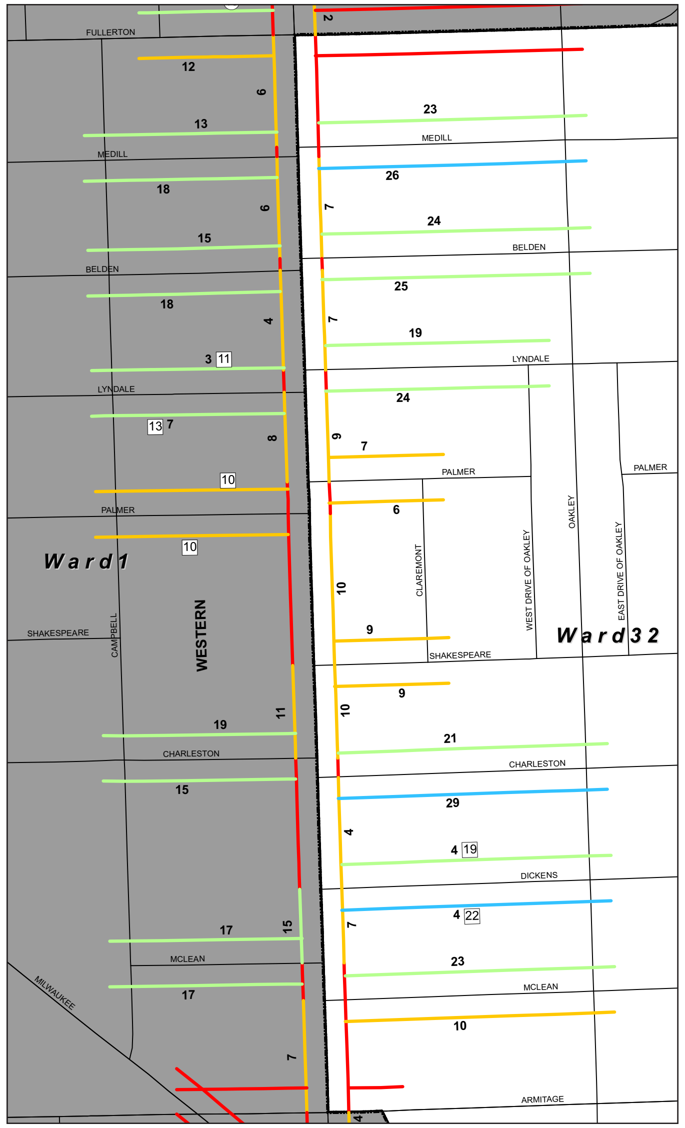
Ward 32, Ashland North



Ward 32, Ashland South



Ward 32, Western (1 of 3)



Ward 32, Western (2 of 3)

Ward 32

There are 28 off-street lots in Ward 32 that could potentially become shared parking.

LEGEND

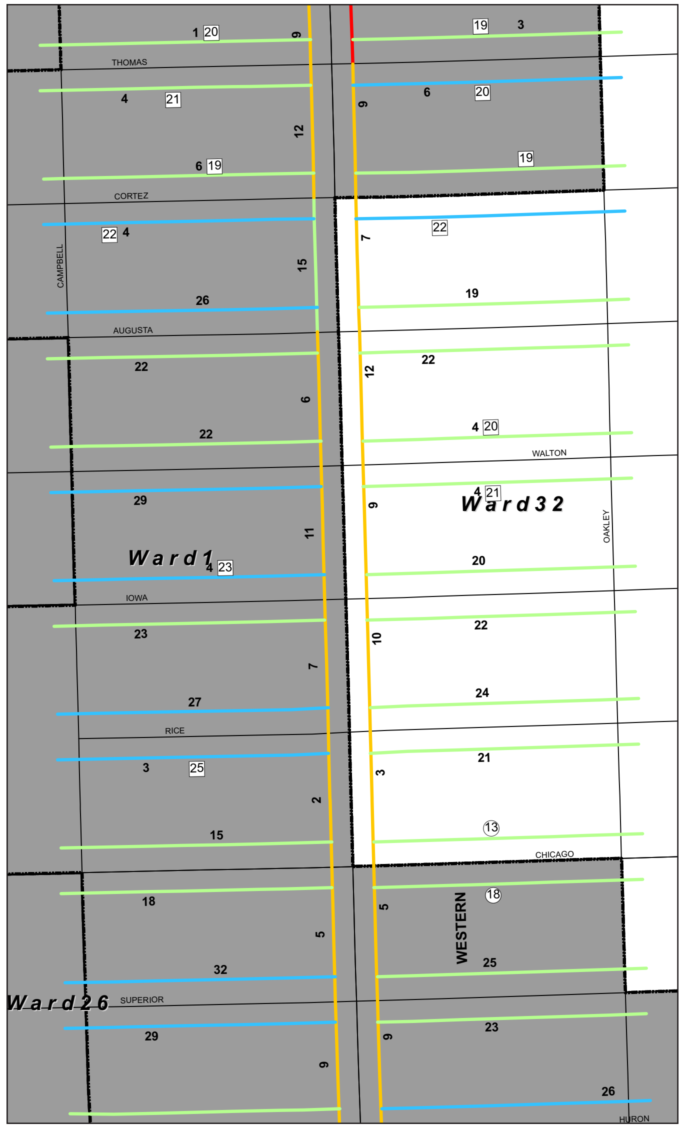
Range of Total Parking per Block Side

🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*

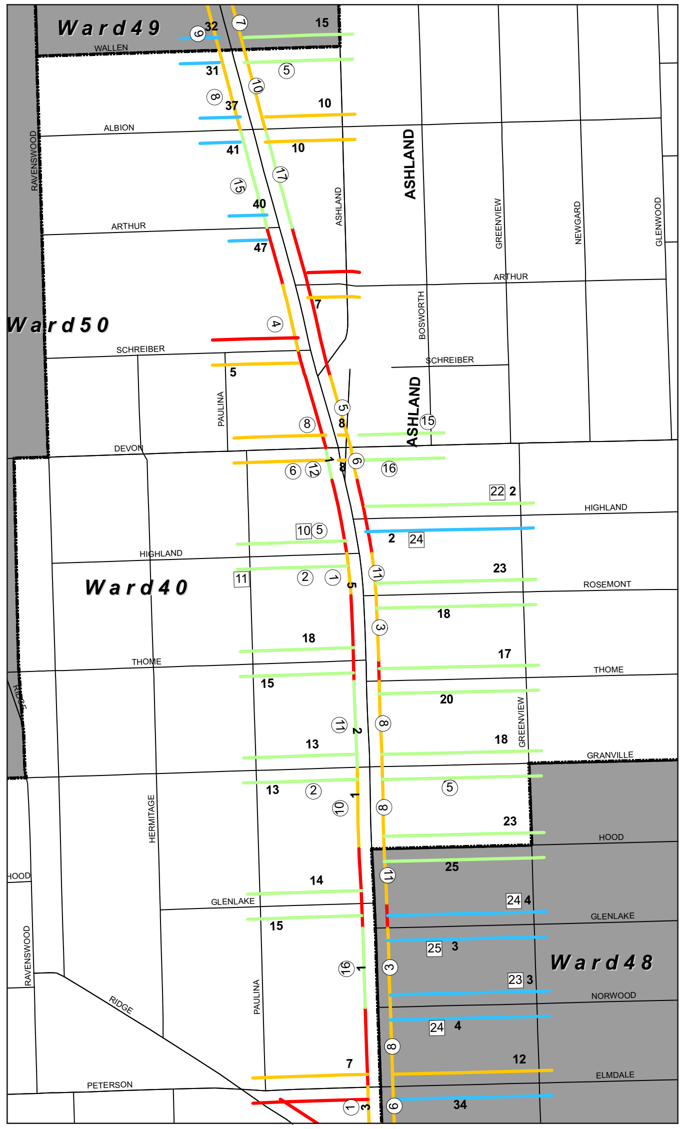
# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

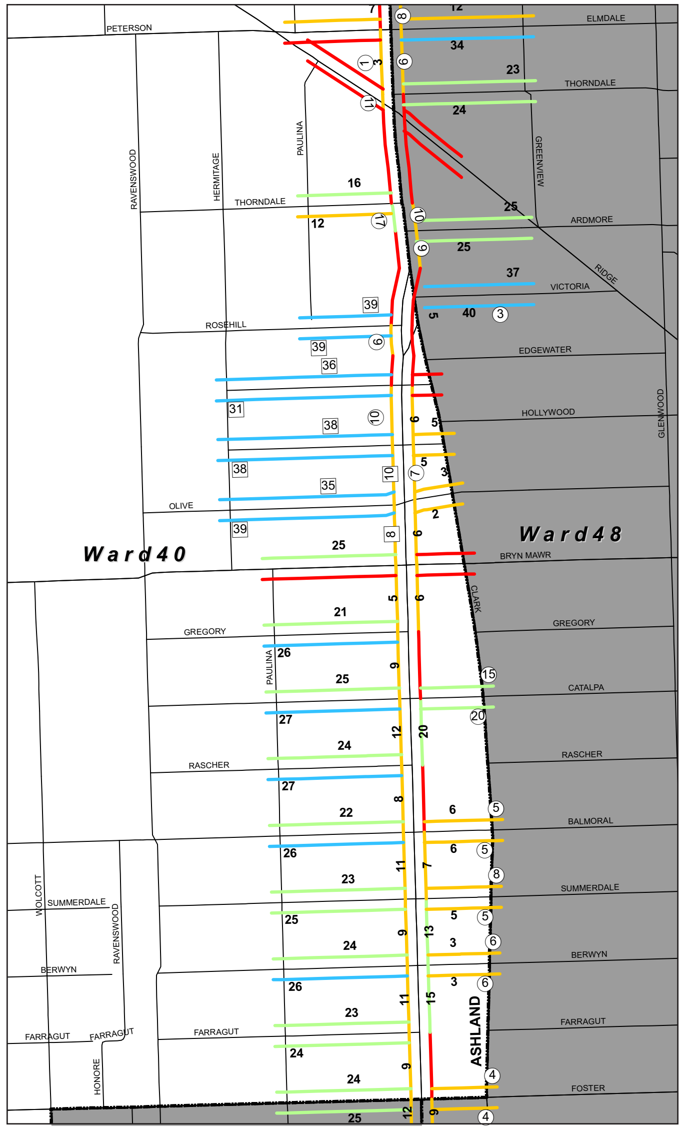


Ward 32, Western (3 of 3)

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	235	0	0	25	2
Cross Streets	502	31	123	9	12
Ashland	408	26	0	15	1
Cross Streets	671	110	21	30	4



Ward 40, Ashland North



Ward 40, Ashland South

Ward 40

There are 8 off-street lots in Ward 40 that could potentially become shared parking.

LEGEND

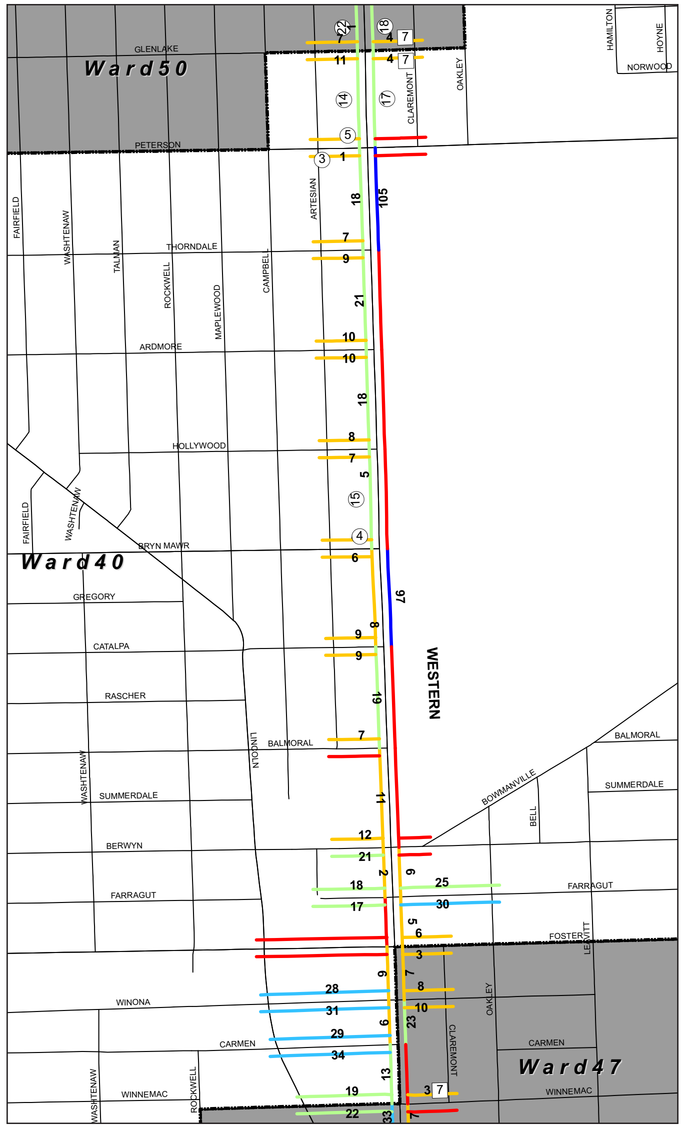
Range of Total Parking per Block Side

- 🟥 0
- 🟨 1–12
- 🟩 13–25
- 🟦 26–50
- 🟦 50+

Number Parking Spaces by Type*

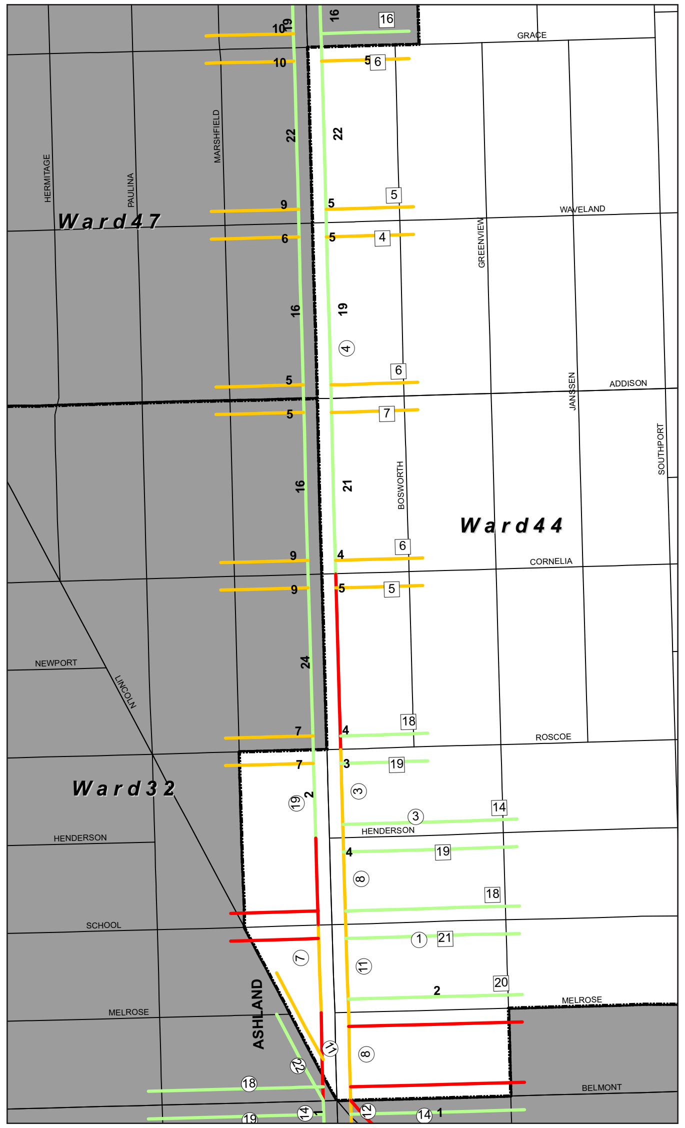
#	Free Parking
ⓘ#	P&D Spaces
▢#	Permit Spaces

*Exact location on block not recorded



Ward 40, Western

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	381	46	0	8	0
Cross Streets	408	12	14	1	6
Ashland	194	247	18	2	0
Cross Streets	998	142	362	6	7



Ward 44

Ward 44

There are 5 off-street lots in Ward 44 that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

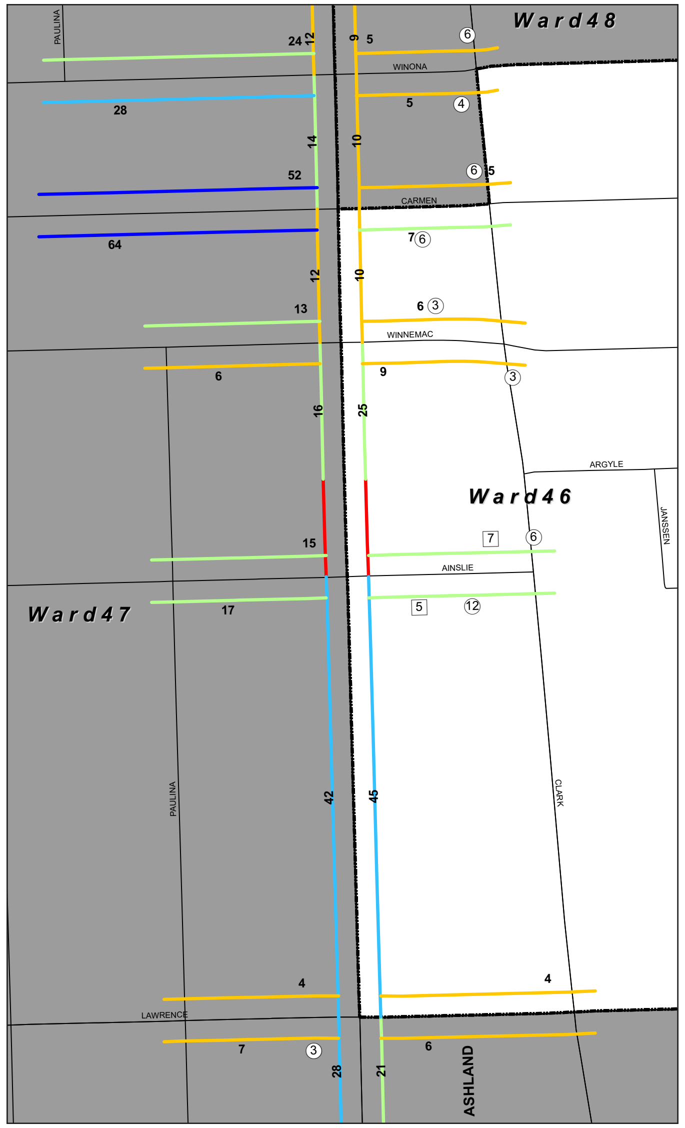
- 🟥 0
- 🟨 1–12
- 🟩 13–25
- 🟦 26–50
- 🟦 50+

Number Parking Spaces by Type*

#	Free Parking
⓪	P&D Spaces
☐	Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland	142	60	0	7	0
Cross Streets	52	51	0	6	1



Ward 46

Ward 46

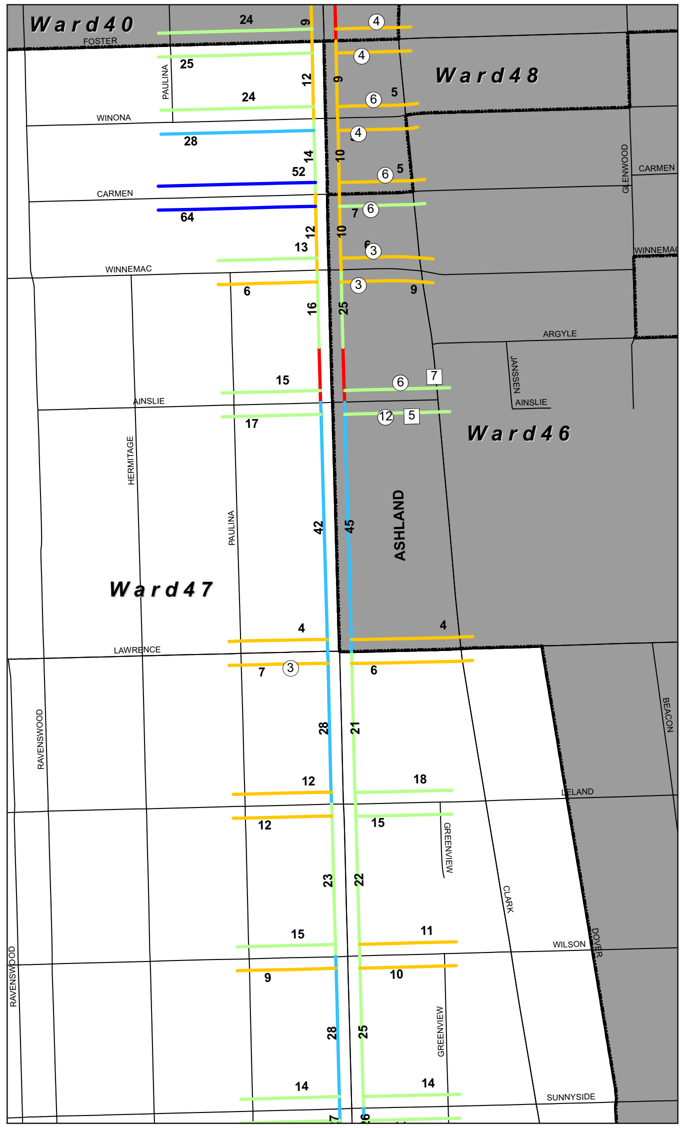
There are no off-street lots in Ward 46 that are immediately obvious to be used as shared-parking sites.

LEGEND

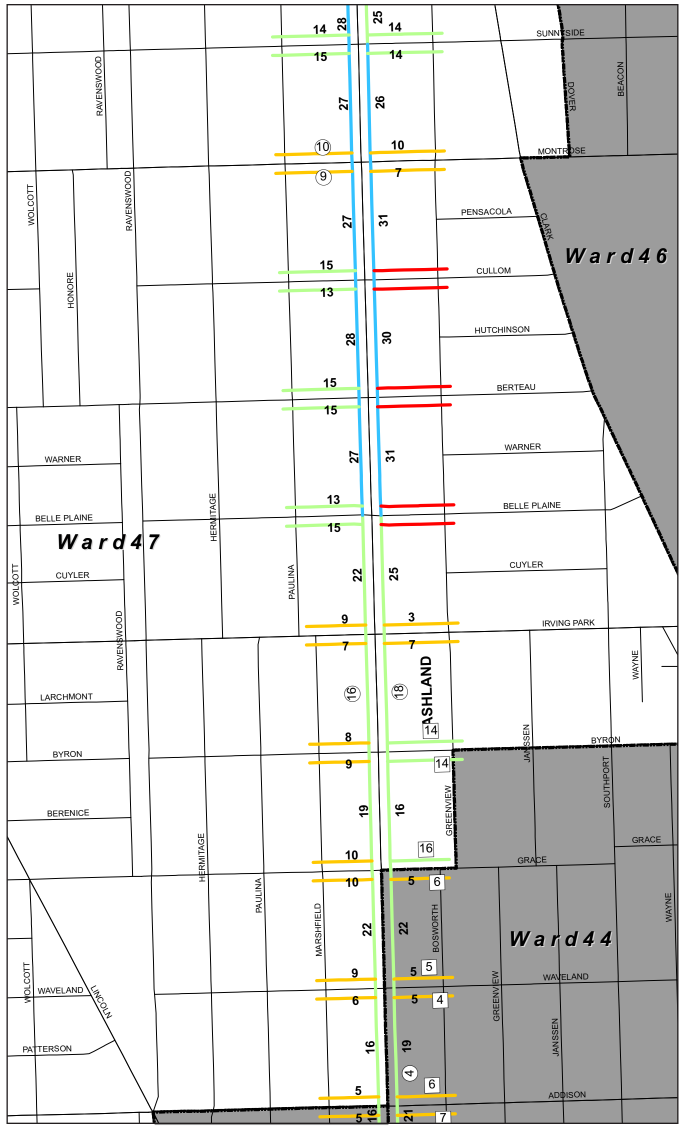
Range of Total Parking per Block Side		Number Parking Spaces by Type*	
🟥	0	#	Free Parking
🟨	1–12	(#)	P&D Spaces
🟩	13–25	[#]	Permit Spaces
🟦	26–50		
🟦	50+		

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland	150	0	0	5	0
Cross Streets	37	36	12	2	1



Ward 47, Ashland North



Ward 47, Ashland South

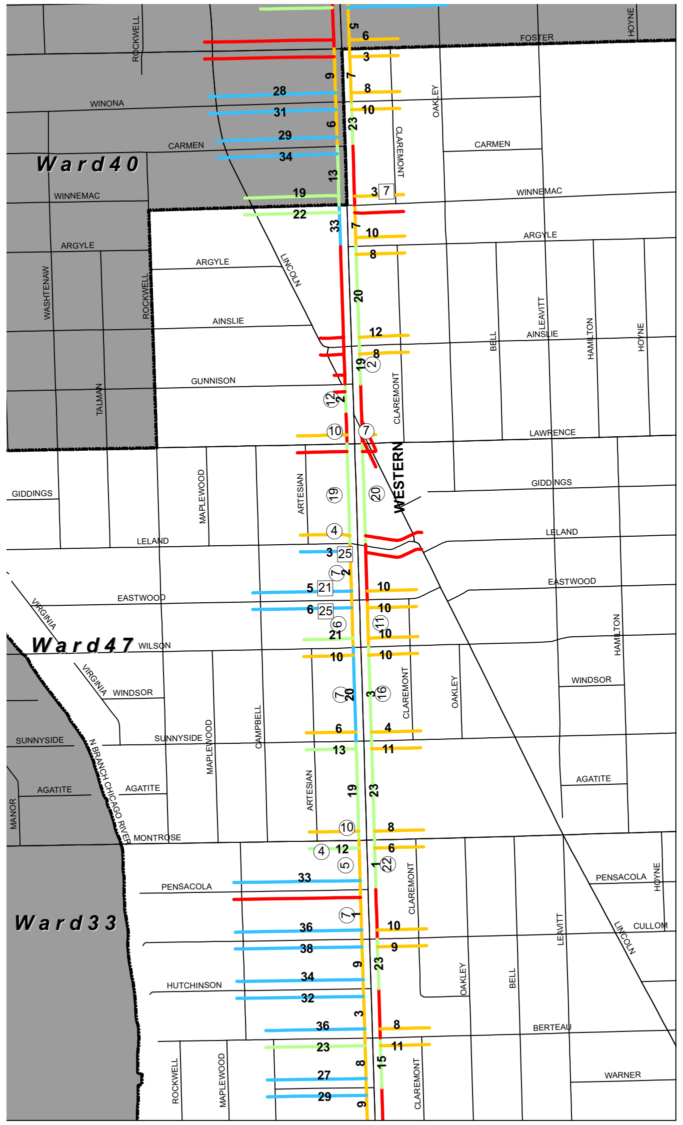
Ward 47

There are 14 off-street lots in Ward 47 that could potentially become shared parking.

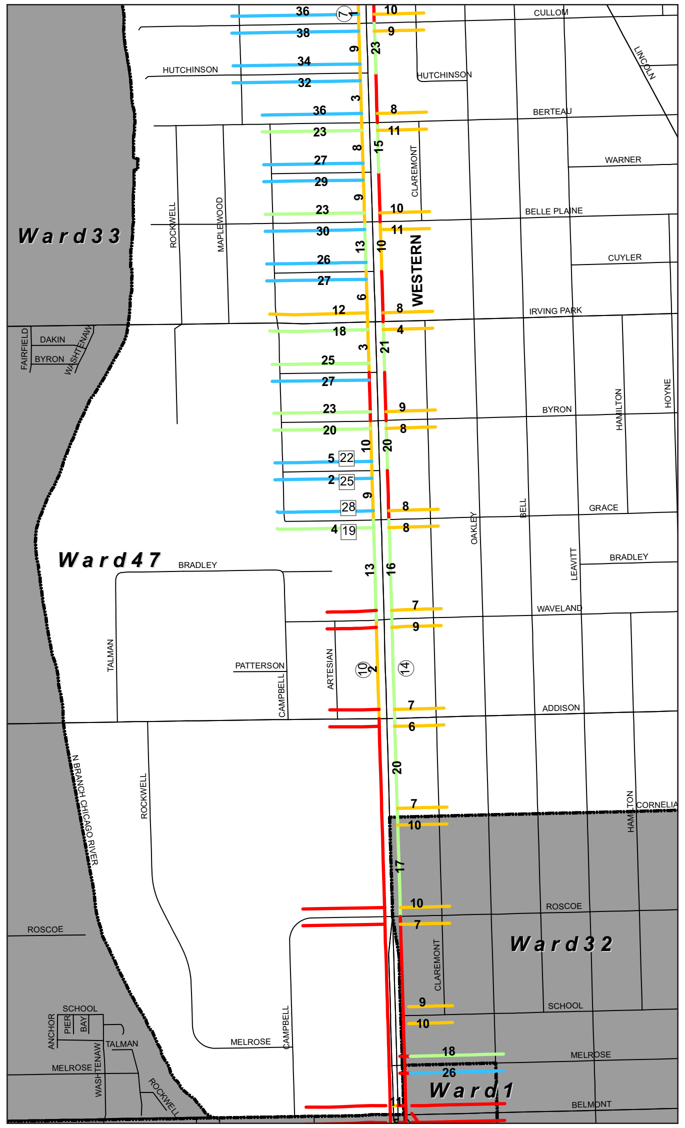
LEGEND

Range of Total Parking per Block Side		Number Parking Spaces by Type*	
🟥	0	#	Free Parking
🟨	1–12	(#)	P&D Spaces
🟩	13–25	[#]	Permit Spaces
🟦	26–50		
🟦	50+		

*Exact location on block not recorded

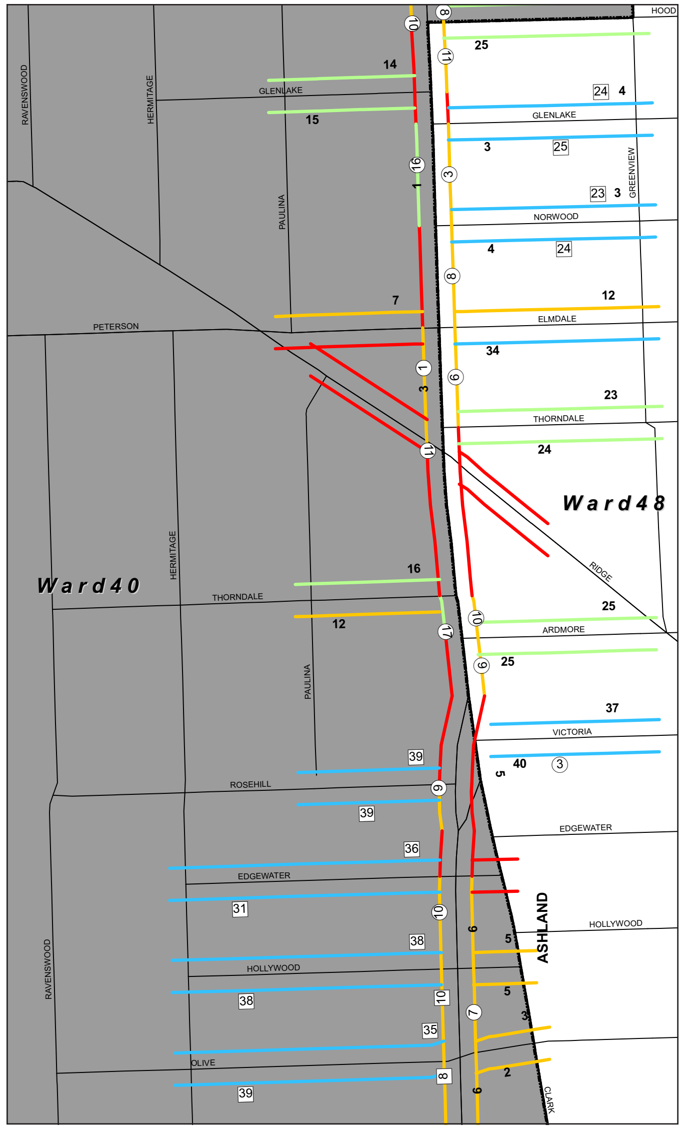


Ward 47, Western North

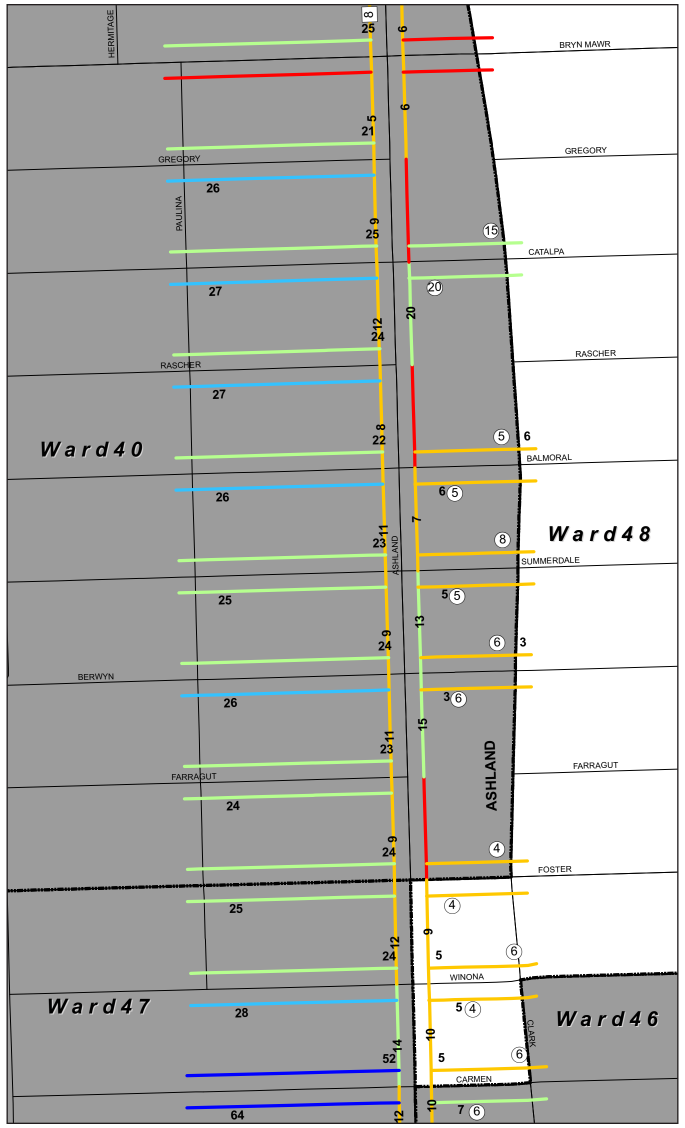


Ward 47, Western South

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	455	158	0	20	0
Cross Streets	950	35	172	11	6
Ashland	730	38	0	20	5
Cross Streets	644	22	0	6	3



Ward 47, Ashland North



Ward 47, Ashland South

Ward 48

There are no off-street lots in Ward 48 that are immediately obvious as sites that could potentially become shared parking.

LEGEND

Range of Total Parking per Block Side

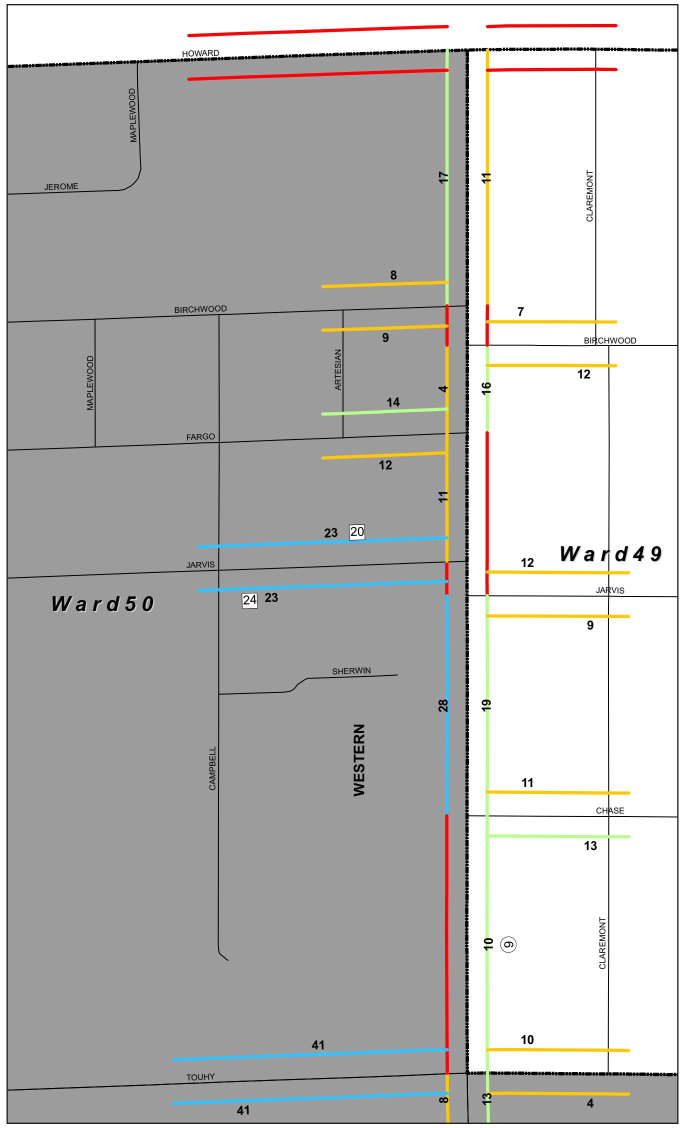
🟥 0
🟨 1–12
🟩 13–25
🟦 26–50
🟦 50+

Number Parking Spaces by Type*

# Free Parking
(#) P&D Spaces
[#] Permit Spaces

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Ashland	31	92	0	0	1
Cross Streets	353	33	96	3	1



Ward 49

Ward 49

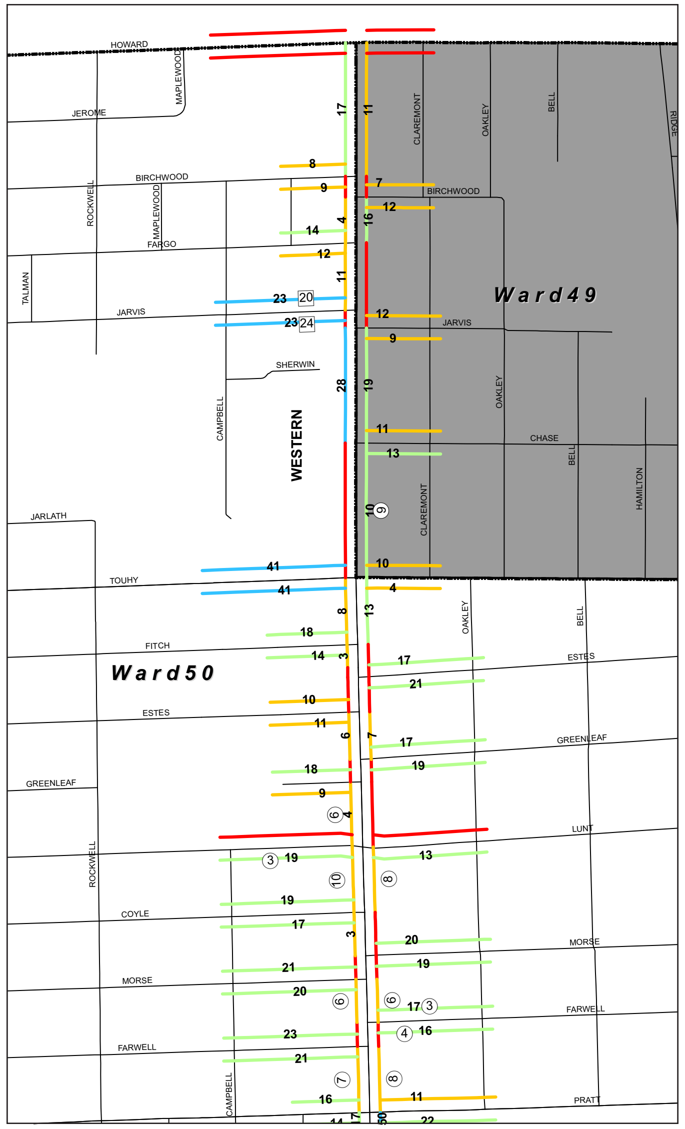
There are 11 off-street lots in Ward 49 that could potentially become shared parking.

LEGEND

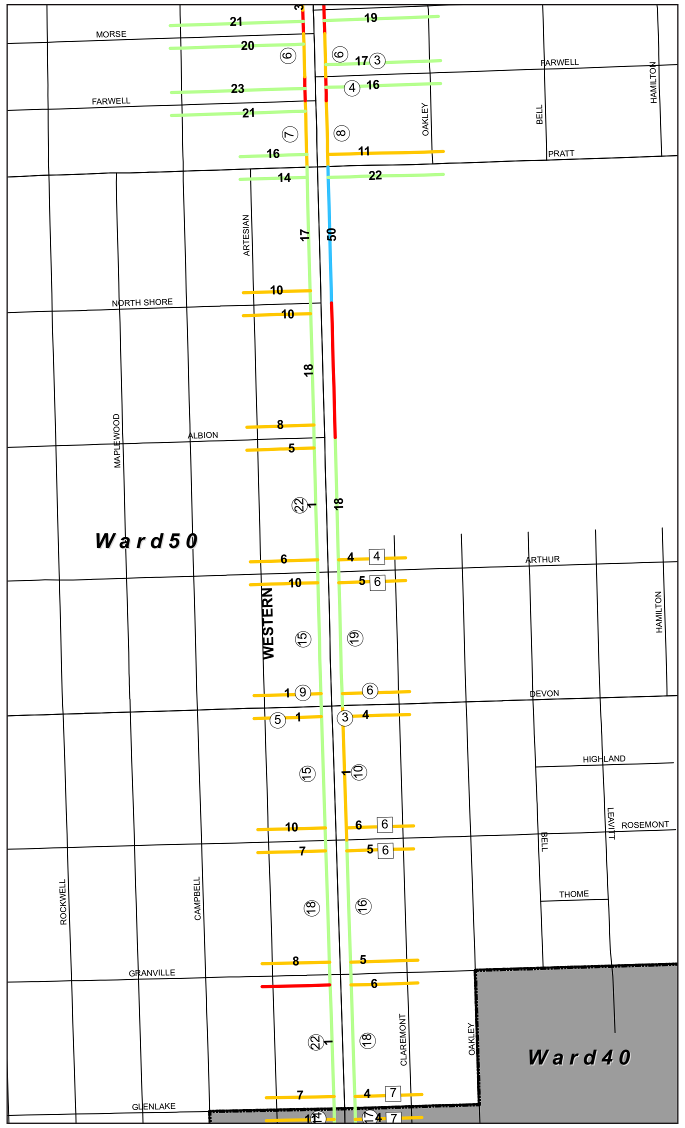
Range of Total Parking per Block Side		Number Parking Spaces by Type*	
🟥	0	#	Free Parking
🟨	1–12	ⓘ#	P&D Spaces
🟩	13–25	☐#	Permit Spaces
🟦	26–50		
🟦	50+		

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	120	9	0	4	0
Cross Streets	78	0	0	0	1
Ashland	32	264	0	23	0
Cross Streets	687	58	0	21	1



Ward 50, North



Ward 50, South

Ward 50

There are 14 off-street lots in Ward 50 that could potentially become shared parking.

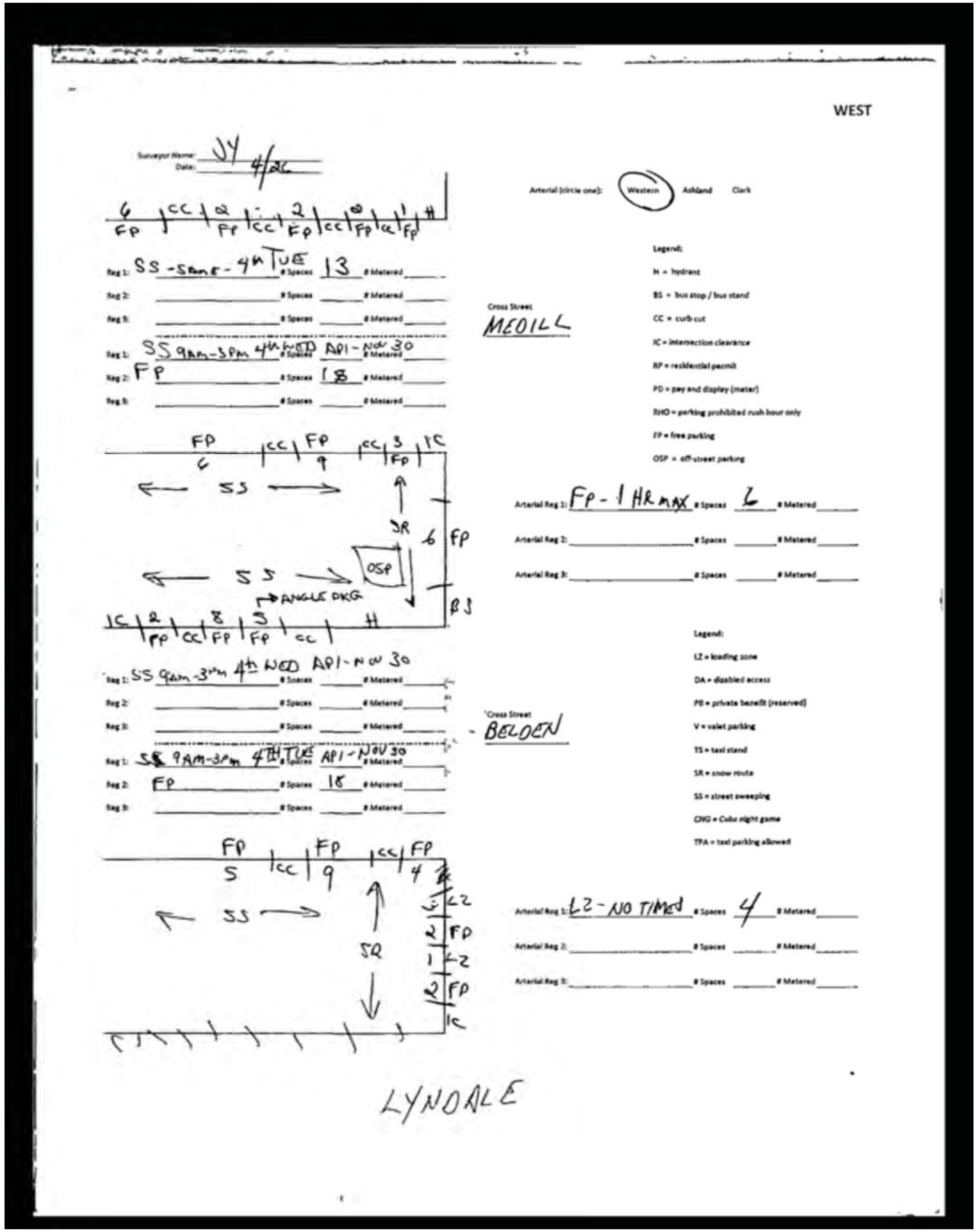
LEGEND

Range of Total Parking per Block Side		Number Parking Spaces by Type*	
🟥	0	#	Free Parking
🟨	1–12	ⓘ#	P&D Spaces
🟩	13–25	☐#	Permit Spaces
🟦	26–50		
🟦	50+		

*Exact location on block not recorded

	Free Parking	Pay & Display	Residential Parking Permit	Loading Zones	Disabled Parking
Western	253	216	0	15	1
Cross Streets	764	33	80	14	7

Appendix B: Typical Data Collection Sheet


6
CC
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SS
SR
6
FP
OSP
SS
ANGLE PKG
BS
IC
2
FP
CC
8
FP
3
FP
CC
H
FP
5
CC
FP
9
CC
FP
4
SS
SR
LZ
2
FP
1
LZ
2
FP
IC
LYNDALE

WEST

Surveyor Name: JY
Date: 4/26

Arterial (circle one): [✓ Western] Ashland Clark

Reg 1: SS -SAME- 4th TUE # Spaces 13 # Metered ____
Reg 2: ____ # Spaces ____ # Metered ____
Reg 3: ____ # Spaces ____ # Metered ____

Cross Street MEDILL

Reg 1: SS 9am-3pm 4th WED # Spaces APl-Nov 30 # Metered ____
Reg 2: FP # Spaces 18 # Metered ____
Reg 3: ____ # Spaces ____ # Metered ____

Legend:

H = hydrant
BS = bus stop / bus stand
CC = curb cut
IC = intersection clearance
RP = residential permit
PD = pay and display (meter)
RHO = parking prohibited rush hour only
FP = free parking
OSP = off-street parking

Arterial Reg 1: FP - 1 HR MAX # Spaces 6 # Metered ____
Arterial Reg 2: ____ # Spaces ____ # Metered ____
Arterial Reg 3: ____ # Spaces ____ # Metered ____

Reg 1: SS 9am-3pm 4th WED APl-Nov 30 # Spaces ____ # Metered ____
Reg 2: ____ # Spaces ____ # Metered ____
Reg 3: ____ # Spaces ____ # Metered ____

Cross Street BELDEN

Reg 1: SS 9AM-3Pm 4TH TUE # Spaces APl-NOV 30 # Metered ____
Reg 2: FP # Spaces 18 # Metered ____
Reg 3: ____ # Spaces ____ # Metered ____

Legend:

LZ = loading zone
DA = disabled access
PB = private benefit (reserved)
V = valet parking
TS = taxi stand
SR = snow route
SS = street sweeping
CNG = Cubs night game
TPA = taxi parking allowed

Arterial Reg 1: LZ - NO TIMES # Spaces 4 # Metered ____
Arterial Reg 2: ____ # Spaces ____ # Metered ____
Arterial Reg 3: ____ # Spaces ____ # Metered ____

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Parking Demand Analysis

Bus Rapid Transit (BRT)

Western and Ashland Corridors BRT Parking Demand Analysis

August 7, 2012

Introduction

The Chicago Transit Authority (CTA) is currently conducting an Alternatives Analysis (AA) planning study to define, evaluate and recommend Bus Rapid Transit (BRT) features and service to the Western Avenue and Ashland Avenue corridors in Chicago. Understanding the potential parking impacts is vital in reaching a Locally Preferred Alternative (LPA) for the project. The southern limit of both corridors is 95th Street, while the northern boundary of the corridors is Howard Street. For purposes of the AA, the Ashland Avenue corridor transitions to Clark Street near Ridge Avenue, and continues along Clark Street to Howard Street. The Western corridor is approximately 21 miles long, while the Ashland corridor is 16 miles long.

In early 2012 a supply-side parking study was performed by the Institute for Transportation & Development Policy (ITDP), *Western & Ashland Parking Supply Analysis (June 2012)*. ITDP's study identified the total number of available parking spaces throughout the Western and Ashland corridors on a block-by-block basis. Their inventories covered both subject streets as well as parking on cross streets, generally within one block east and west of the corridors. According to the report, there are 4,370 total parking spaces within the Western corridor, and 3,676 total parking spaces within the Ashland corridor (excluding cross street parking).

The intent of this *Parking Demand Analysis* is to build upon the ITDP data on parking supply, by providing a "snapshot" of maximum and average parking usage in different sections of each corridor. Detailed analysis is organized by ward and shown graphically by block in a format that mirrors the ITDP report for ease of comparison. It should be noted that for this parking demand analysis the northern limit of data collection along the Ashland corridor is Irving Park Road, the existing terminus of the Route #9 Ashland bus. The numbers referenced from ITDP's report have been adjusted accordingly. Once conceptual BRT designs for the corridors are developed, an overall assessment of parking impacts and potential for parking replacement can be completed with the information provided in both the Parking Supply and Demand studies.

Methodology

Field teams were deployed over a period of 8 days between July 17 and July 29, 2012. During this span, day of week surveys covered Monday (7/23), Tuesdays (7/17 & 7/25), Wednesdays (7/18 & 7/26), Thursday (7/19), Saturday (7/21) and Sunday (7/29). Surveyors recorded the presence of parked vehicles on each block throughout both corridors to measure six distinct temporal data sets:

- Early AM Peak (6am - 7am)
- AM Peak (7am - 9am)
- Midday (9am - 4pm)
- PM Peak (4pm - 6pm)
- Evening (6pm - 9pm)
- Weekend (all Saturday and Sunday)

Data collection was primarily focused on obtaining a complete data set for the AM Peak, Midday, PM Peak and Weekend time periods. During these core time periods, there were as many as eight observations made for a portion of the corridors. During the beginning and ending weekday periods, fewer observations were made. An overnight field count was not performed as part of this study, but should be considered as a final piece of the AA. Consistent weekend counts for both corridors involved collecting three sets of observations for Western and four for Ashland. A typical data collection field record form is shown in Appendix B.

The analysis of demand included two measures of use from the field work. An average count of vehicles observed was computed for each street block, representing a typical measure of parking use. The maximum number of vehicles observed per block segment, regardless of time period and date, was also extracted from the survey results.

Counts of parked vehicles were collected for both sides of the street for each corridor. The type of parking spaces being used, however, was not identified (e.g., Free, Pay & Display). Unlike the ITDP inventory of parking supply, data was not collected for any cross streets. It should be noted that comparing observed parked vehicles with ITDP reporting parking capacity found instances where percent utilization was over 100 percent. This reflects instances where the observed number of parked vehicles exceeds the estimated number of available parking spaces. It is believed that this was principally the result of the inherent difficulties in estimating capacity, such as parking stalls are not marked and the replacement of single-space parking meters with Pay & Display boxes, judging capacity is somewhat arbitrary. The number of cars able to park in a given curbspace is also a function of vehicle size, for example, more sub-compacts are able to fit into a defined space than standard sized autos.

Existing Parking Demand

Western Corridor Overview

Table 1 summarizes results for the Western corridor between 95th Street and Howard. According to ITDP's *Parking Supply Analysis* report, there are 4,370 total parking spaces on either side of Western (not including parking on cross streets). Table 1 illustrates the average usage of the on-street parking spaces by service period. As can been seen, average parking use observed was highest during the weekday midday and PM Peak periods and on Saturdays. The maximum weekday parking observed approached 3,000 parked vehicles, as compared to the average number observed for Midday of 1,829.

Table 1. Western Avenue Parking Supply and Demand

		Parking Capacity (spaces)	Parking Use (vehicles)	% Use
Supply of Parking (spaces)		**4,370**		
Average Use of Parking				
Early AM Peak*	6a-7a		652	15%
AM Peak	7a-9a		1,320	30%
Midday	9a-4p		1,829	42%
PM Peak	4p-6p		1,683	39%
Evening*	6p-9p		1,322	30%
Saturday			1,756	40%
Sunday			1,335	31%
Maximum Use of Parking				
Weekday			2,967	68%
Saturday			2,269	52%
Sunday			1,674	38%

*Counts were not completed for the entire corridor.

Although the maximum is significant higher than the Midday average (i.e., 60% above average), nearly one-third of on-street parking on Western remains unused (i.e., 1,403 spaces of 4,270).

Ashland Corridor Overview

Table 2 summarizes results for the Ashland corridor between 95th Street and Irving Park Road. ITDP reported 3,676 total parking spaces within these limits. The average observed parking use was highest for the Midday and Saturday service periods (i.e. 1,338 and 1,375). Maximum use was significantly higher than average use, although as with Western, roughly one-third of the total capacity remains un-used.

Table 2. Ashland Avenue Parking Supply and Demand

		Parking Capacity (spaces)	Parking Use (vehicles)	% Use
Supply of Parking (spaces)		**3,676**		
Average Use of Parking				
Early AM Peak*	6a-7a		732	20%
AM Peak	7a-9a		917	25%
Midday	9a-4p		1,338	36%
PM Peak	4p-6p		1,175	32%
Evening	6p-9p		1,155	31%
Saturday			1,375	37%
Sunday			1,226	33%
Maximum Use of Parking				
Weekday			2,467	67%
Saturday			1,873	51%
Sunday			1,825	50%

*Counts were not completed for the entire corridor.

Ward Maps

The maps in Appendix A display parking supply and parking demand data for each block within the two corridors. Each block-face is color-coded by capacity utilization of maximum parking (highest observed maximum value for weekday or weekend). In addition, each side of the respective corridors includes the following data:

- **Maximum Spaces Used**
- [Total Spaces Available]

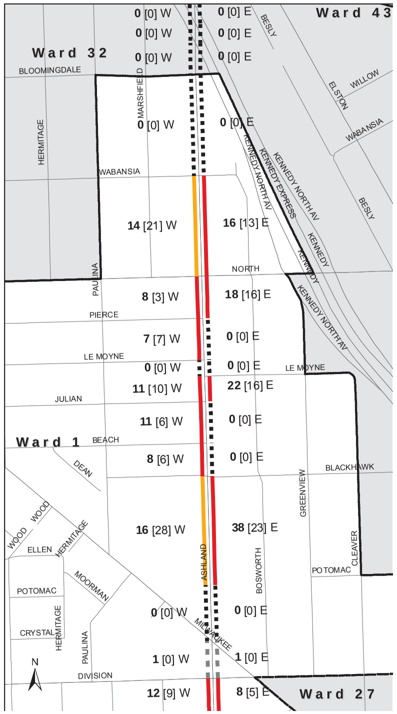
In addition, a small data table accompanies each ward map, and includes the following summary information by ward:

- Available spaces
- Weekday Maximum and Average Spaces Used, including percent utilization
- Weekend Maximum and Average Spaces Used, including percent utilization

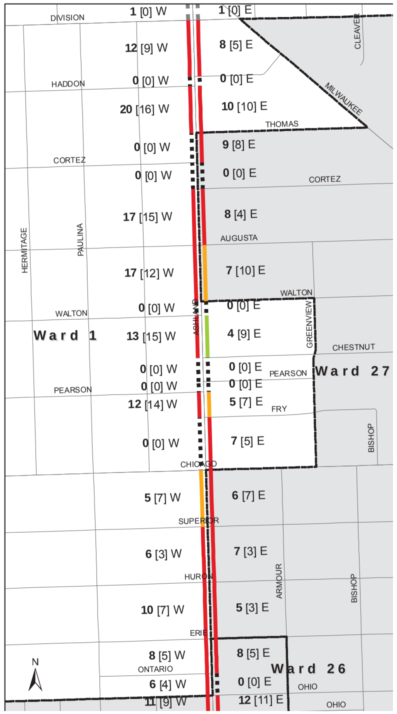
The type of utilized parking space (e.g., Free, Pay & Display, Loading Zone) has not been explicitly identified (see ITDP's *Western & Ashland Parking Supply Analysis* for more information). Note that parking spaces at ward boundaries are shown and counted in both wards. This approach mirrors ITDP's efforts on the supply-side parking analysis, as these spaces are important to each alderman. This double-counting does not affect the corridor totals shown in the overview tables of Tables 1 and 2.

Appendix A

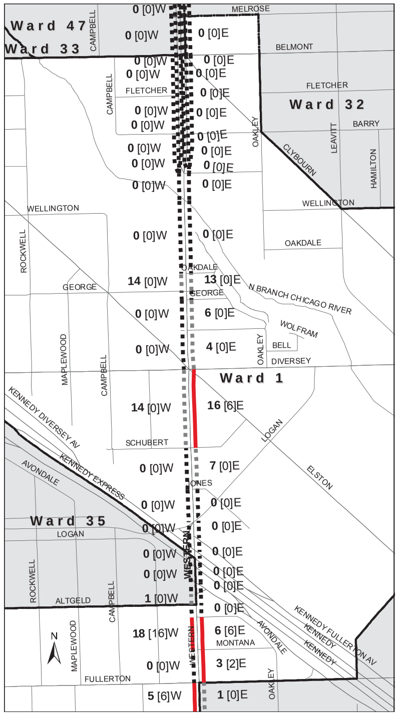
Ward Maps



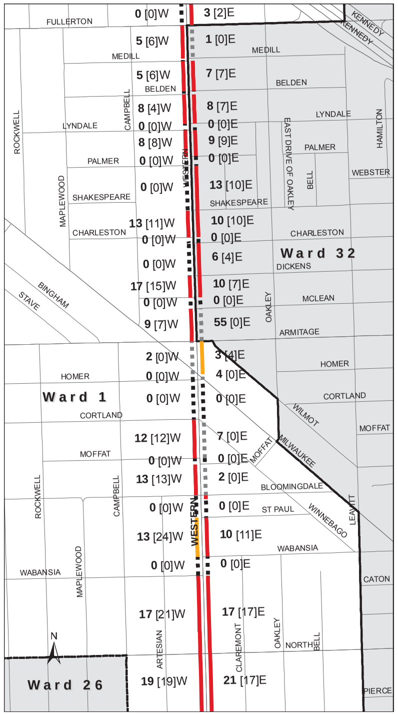
Ward 1, Ashland North (1 of 2)



Ward 1, Ashland South (2 of 2)



Ward 1, Western (1 of 3)



Ward 1, Western (2 of 3)

Ward 1

Legend

■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

0□
1□ - 25□
26□ - 50□
51□ - 75□
76□ - 100□ □

Ward 1

Legend

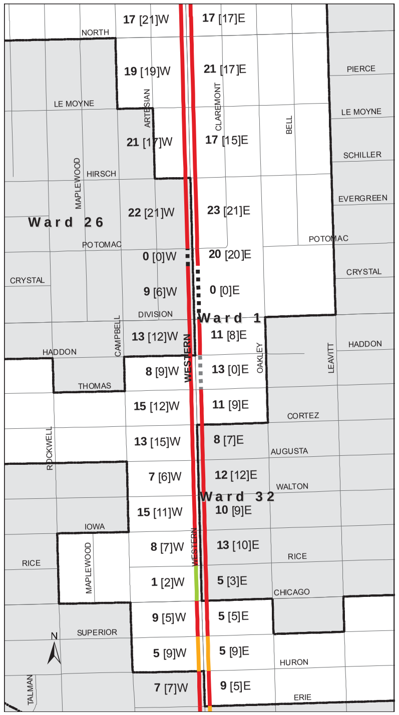
■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

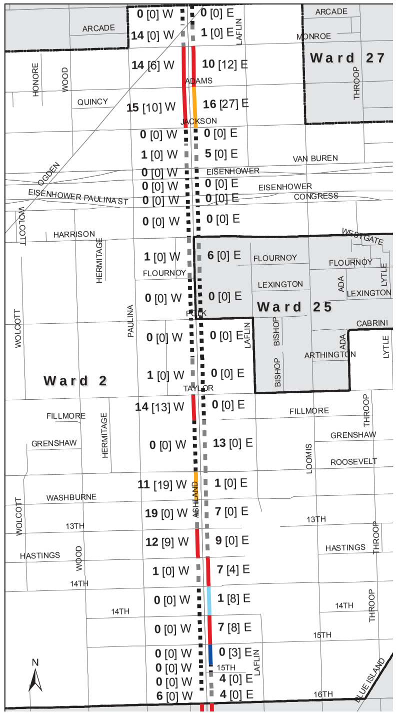
5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

0□
1□ - 25□
26□ - 50□
51□ - 75□
76□ - 100□ □



Ward 1, Western (3 of 3)



Ward 2, Ashland

Ward 1, Ward 2

Legend

■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

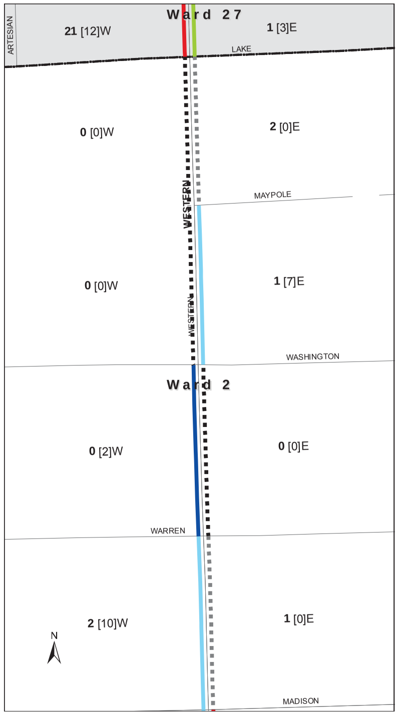
5 Maximum Spaces Used
[10] Total Spaces Available
W West-side of corridor
E East-side of corridor

Maximum Utilization

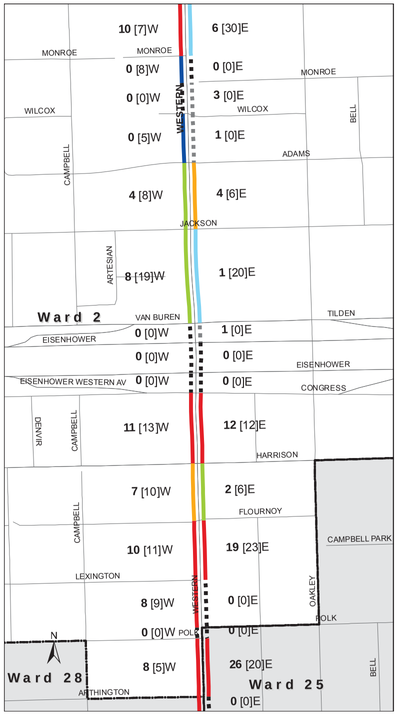
🟦 0%
🟦 1% - 25%
🟩 26% - 50%
🟧 51% - 75%
🟥 76% - 100%

Ward 1	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	668	714	441	639	459
Utilization		107% *	66%	96%	69%
Ashland	362	372	213	347	224
Utilization		103% *	59%	96%	62%

*Note: Number of vehicles observed > assumed number of spaces available



Ward 2, Western North (1 of 2)



Ward 2, Western South (2 of 2)

Ward 2

Legend

■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

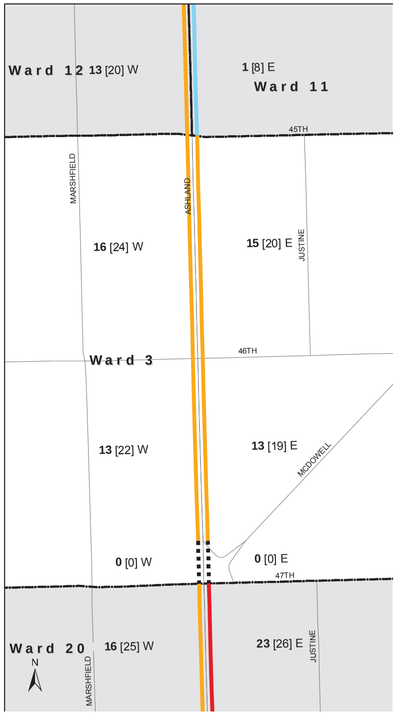
5 Maximum Spaces Used
[10] Total Spaces Available
W West-side of corridor
E East-side of corridor

Maximum Utilization

🟦 0%
🟦 1% - 25%
🟩 26% - 50%
🟧 51% - 75%
🟥 76% - 100%

Ward 2	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	237	137	78	112	76
Utilization		58%	33%	47%	32%
Ashland	129	150	42	81	29
Utilization		116% *	32%	63%	22%

*Note: Number of vehicles observed > assumed number of spaces available



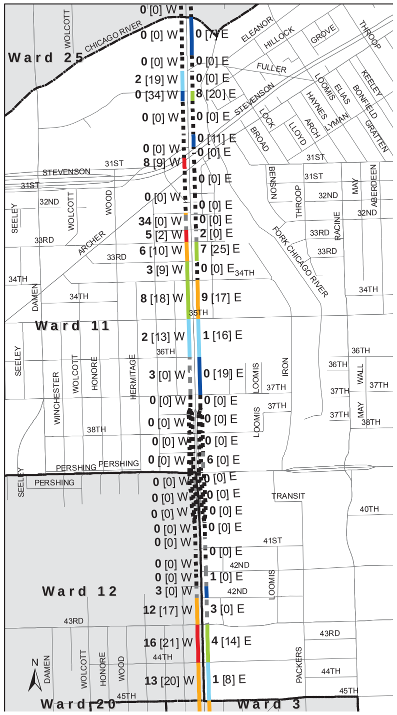
Ward 3

Ward 3

Legend
- ■ ■ No Parking Zone
- ■ ■ Vehicle in No Parking Zone
- **5** □Maximum Spaces Used
- [10] □Total Spaces Available
- W □West-side of corridor
- E □East-side of corridor

Maximum Utilization
- ▬ 0□
- ▬ 1□ - 25□
- ▬ 26□ - 50□
- ▬ 51□ - 75□
- ▬ 76□ - 100□ □

Ward 3	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Ashland	86	44	16	53	27
Utilization		51%	19%	62%	31%



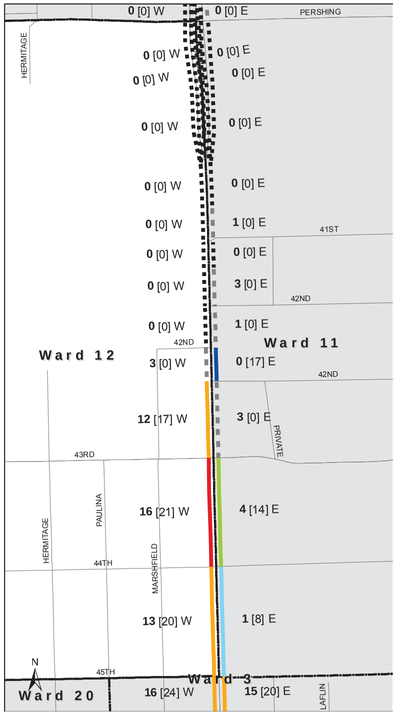
Ward 11

Ward 11

Legend
- ■ ■ No Parking Zone
- ■ ■ Vehicle in No Parking Zone
- **5** □Maximum Spaces Used
- [10] □Total Spaces Available
- W □West-side of corridor
- E □East-side of corridor

Maximum Utilization
- ▬ 0□
- ▬ 1□ - 25□
- ▬ 26□ - 50□
- ▬ 51□ - 75□
- ▬ 76□ - 100□ □

Ward 11	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Ashland	336	138	44	107	56
Utilization		41%	13%	32%	17%



Ward 12, Ashland

Ward 12

Legend

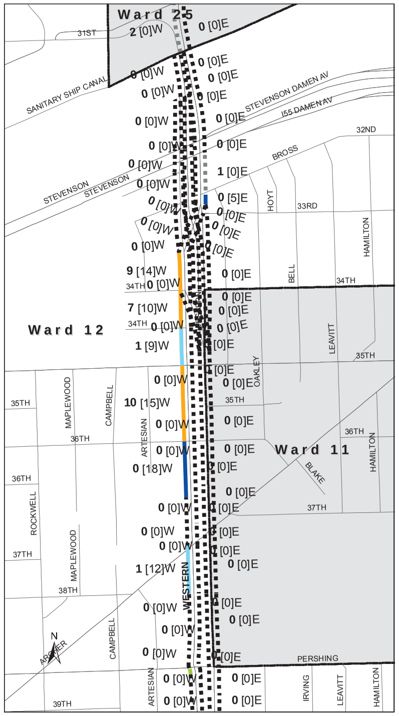
▪ ▪ No Parking Zone

▪ ▪ Vehicle in No Parking Zone

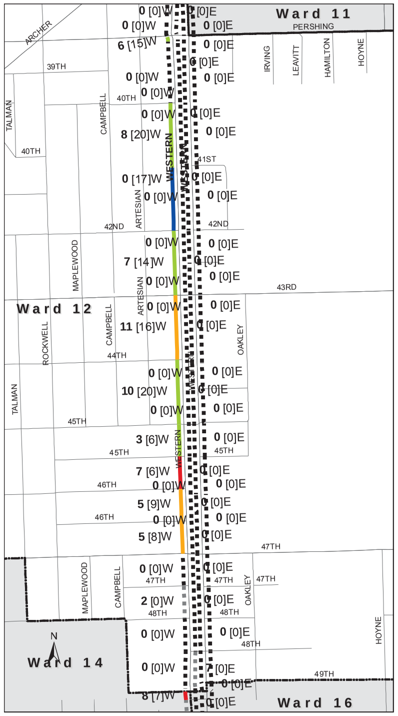
5 □ Maximum Spaces Used
[10] □ Total Spaces Available
W □ West-side of corridor
E □ East-side of corridor

Maximum Utilization

0□
1□ - 25□
26□ - 50□
51□ - 75□
76□ - 100□ □



Ward 12, Western North (1 of 2)



Ward 12, Western South (2 of 2)

Ward 12

Legend

▪ ▪ No Parking Zone

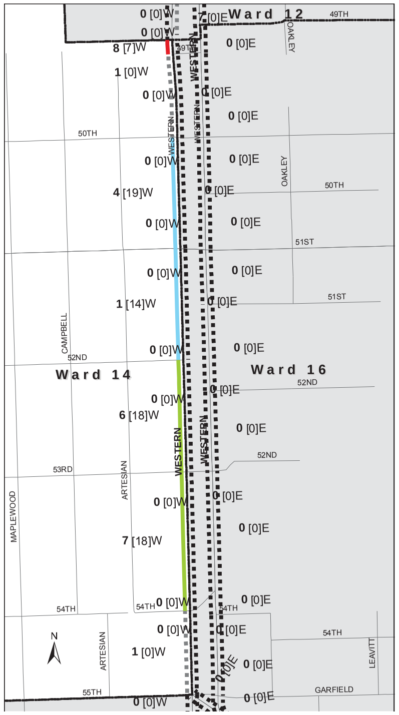
▪ ▪ Vehicle in No Parking Zone

5 □ Maximum Spaces Used
[10] □ Total Spaces Available
W □ West-side of corridor
E □ East-side of corridor

Maximum Utilization

0□
1□ - 25□
26□ - 50□
51□ - 75□
76□ - 100□ □

Ward 12	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	218	96	36	84	51
Utilization		44%	17%	39%	23%
Ashland	97	43	19	51	26
Utilization		44%	19%	53%	27%



Ward 14

Ward 14

Field observations found that a Car Dealership south of 53rd Street parked vehicles on Western following the morning rush period for advertising purposes. These vehicles impact space utilization in Ward 14.

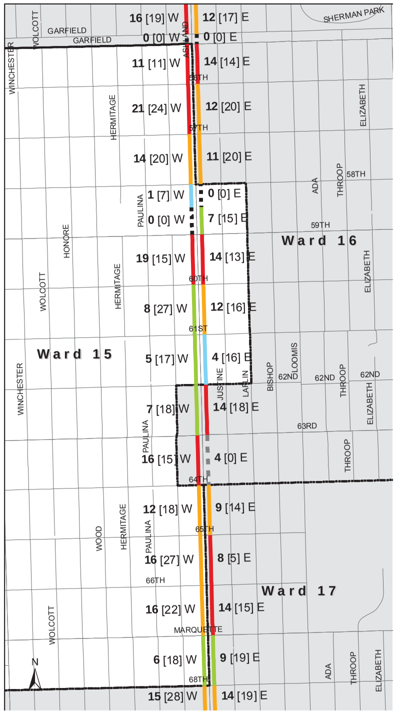
Legend

- ■ ■ No Parking Zone
- ■ ■ Vehicle in No Parking Zone
- 5 □Maximum Spaces Used
- [10] □Total Spaces Available
- W □West-side of corridor
- E □East-side of corridor

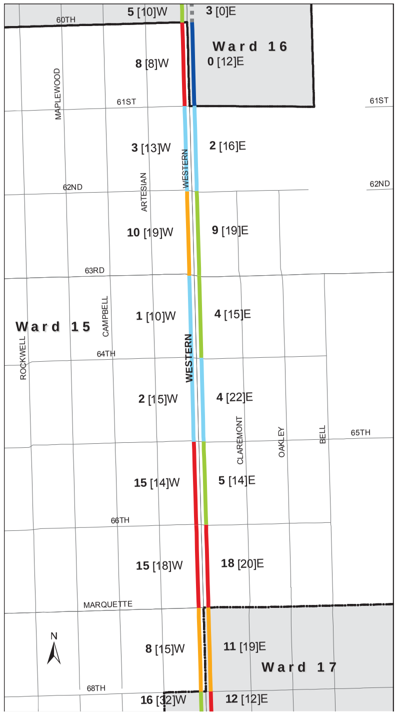
Maximum Utilization

- 0□
- 1□ - 25□
- 26□ - 50□
- 51□ - 75□
- 76□ - 100□ □

Ward 14	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	76	18	7	12	6
Utilization		24%	9%	16%	8%



Ward 15, Ashland



Ward 15, Western

Ward 15

Field observations found that Car Dealerships along Western parked vehicles on-street following the morning rush period for advertising purposes. These vehicles impact space utilization in Ward 15.

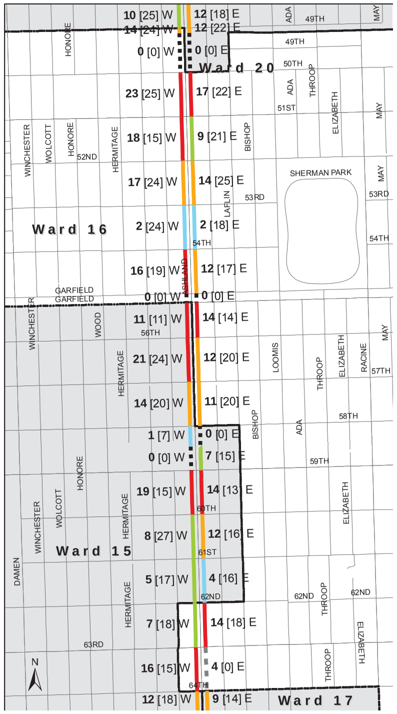
Legend

- ■ ■ No Parking Zone
- ■ ■ Vehicle in No Parking Zone
- 5 □Maximum Spaces Used
- [10] □Total Spaces Available
- W □West-side of corridor
- E □East-side of corridor

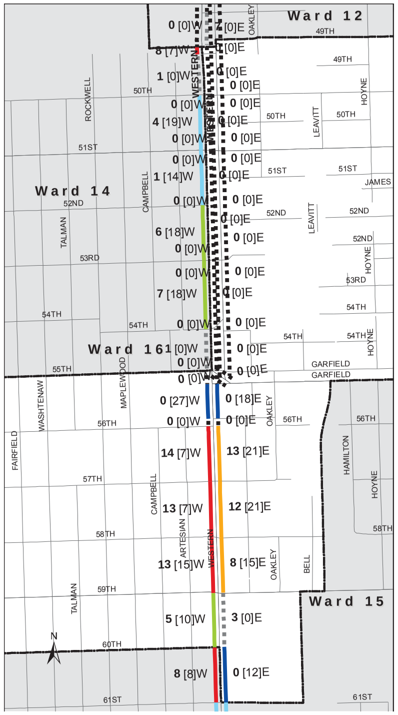
Maximum Utilization

- 0□
- 1□ - 25□
- 26□ - 50□
- 51□ - 75□
- 76□ - 100□ □

Ward 15	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	275	112	56	98	44
Utilization		41%	20%	36%	16%
Ashland	375	165	57	216	88
Utilization		44%	15%	58%	23%



Ward 16, Ashland



Ward 16, Western

Ward 16

Field observations found that Car Dealerships along Western parked vehicles on-street following the morning rush period for advertising purposes. These vehicles impact space utilization in Ward 16.

Legend

■ ■ No Parking Zone

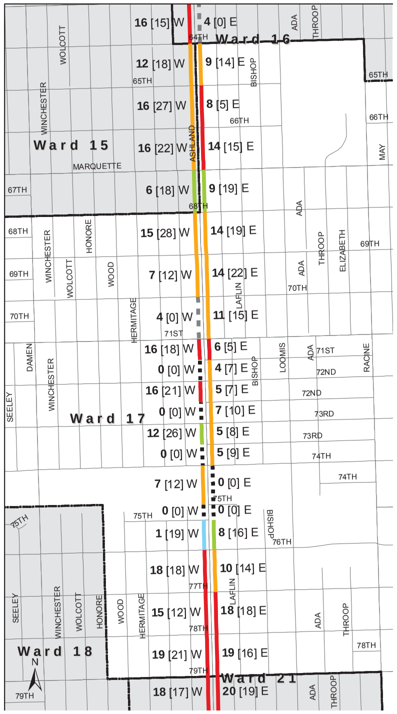
■ ■ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

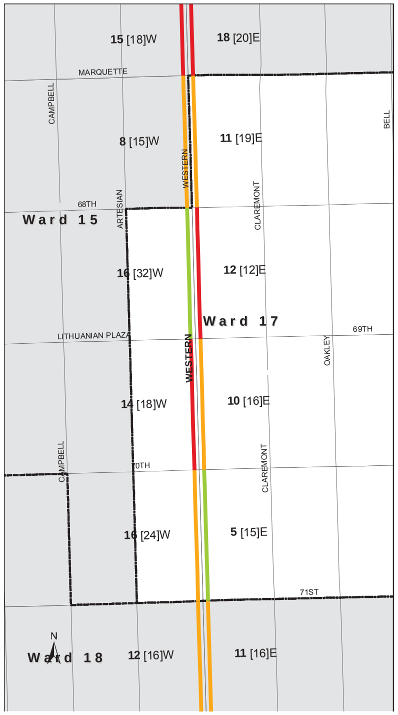
Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □

Ward 16	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	237	111	54	81	35
Utilization		47%	23%	34%	15%
Ashland	416	251	106	212	108
Utilization		60%	26%	51%	26%



Ward 17, Ashland



Ward 17, Western

Ward 17

Field observations found that Car Dealerships along Western parked vehicles on-street following the morning rush period for advertising purposes. These vehicles impact space utilization in Ward 17.

Legend

■ ■ No Parking Zone

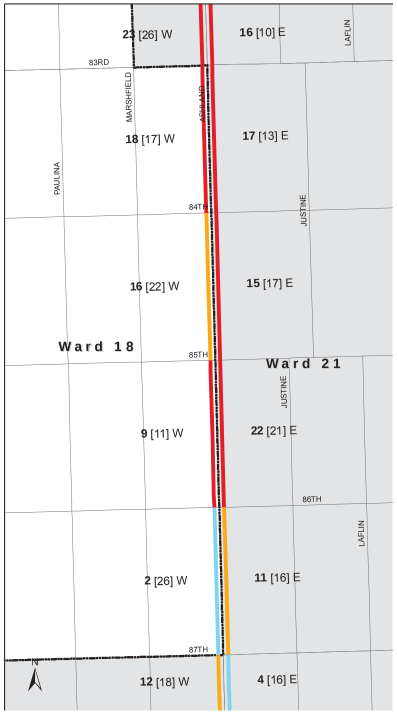
■ ■ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

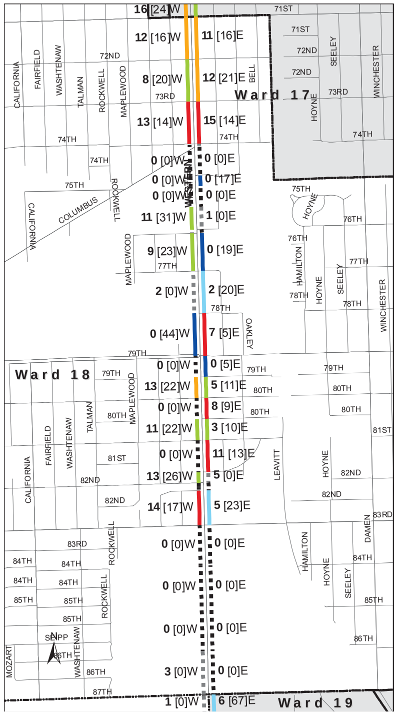
Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □

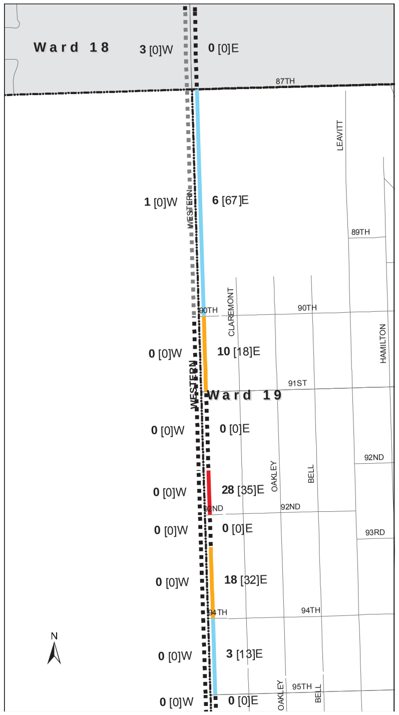
Ward 17	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	151	95	49	91	42
Utilization		63%	32%	60%	28%
Ashland	494	208	75	321	128
Utilization		42%	15%	65%	26%



Ward 18, Ashland



Ward 18, Western



Ward 19

Ward 18

Field observations found that Car Dealerships along Western parked vehicles on-street following the morning rush period for advertising purposes. These vehicles impact space utilization in Ward 18.

Legend

■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

5 = Maximum Spaces Used
[10] = Total Spaces Available
W = West-side of corridor
E = East-side of corridor

Maximum Utilization

🟦 0%
🟦 1% - 25%
🟩 26% - 50%
🟧 51% - 75%
🟥 76% - 100%

Ward 18	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	418	186	85	146	62
Utilization		44%	20%	35%	15%
Ashland	145	88	42	103	54
Utilization		61%	29%	71%	37%

Ward 19

Field observations found that Car Dealerships along Western parked vehicles on-street following the morning rush period for advertising purposes. These vehicles impact space utilization in Ward 19.

Legend

■ ■ No Parking Zone

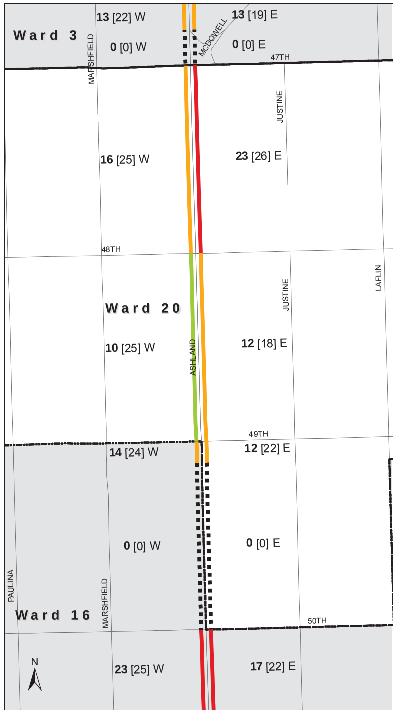
■ ■ Vehicle in No Parking Zone

5 = Maximum Spaces Used
[10] = Total Spaces Available
W = West-side of corridor
E = East-side of corridor

Maximum Utilization

🟦 0%
🟦 1% - 25%
🟩 26% - 50%
🟧 51% - 75%
🟥 76% - 100%

Ward 19	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	165	66	34	44	17
Utilization		40%	21%	27%	10%



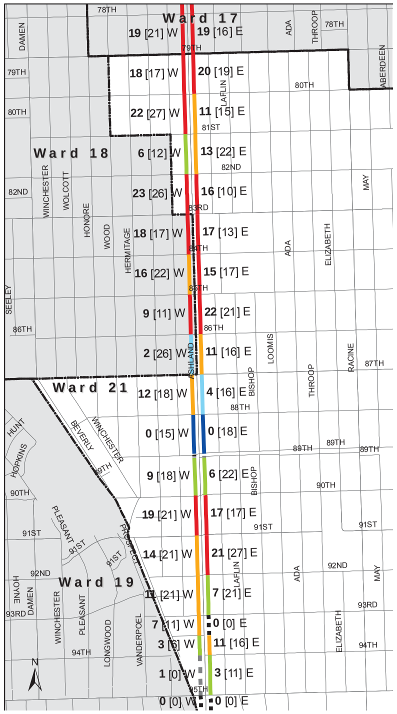
Ward 20

Ward 20

Legend
- ■ ■ No Parking Zone
- ■ ■ Vehicle in No Parking Zone
- 5 □ Maximum Spaces Used
- [10] □ Total Spaces Available
- W □ West-side of corridor
- E □ East-side of corridor

Maximum Utilization
- 🟦 0□
- 🟦 1□ - 25□
- 🟩 26□ - 50□
- 🟧 51□ - 75□
- 🟥 76□ - 100□ □

Ward 20	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Ashland	140	81	32	69	36
Utilization		58%	23%	49%	25%



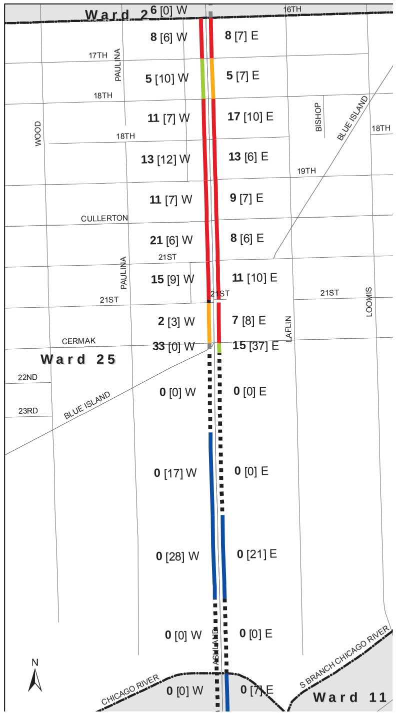
Ward 21

Ward 21

Legend
- ■ ■ No Parking Zone
- ■ ■ Vehicle in No Parking Zone
- 5 □ Maximum Spaces Used
- [10] □ Total Spaces Available
- W □ West-side of corridor
- E □ East-side of corridor

Maximum Utilization
- 🟦 0□
- 🟦 1□ - 25□
- 🟩 26□ - 50□
- 🟧 51□ - 75□
- 🟥 76□ - 100□ □

Ward 21	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Ashland	573	334	156	343	179
Utilization		58%	27%	60%	31%



Ward 25, Ashland

Ward 25

Legend

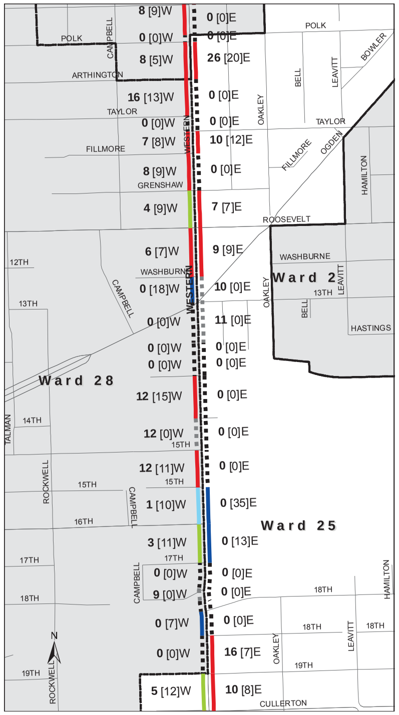
■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

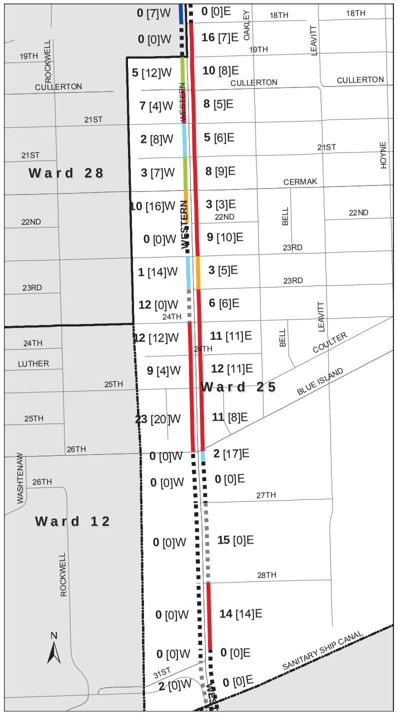
5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □



Ward 25, Western North (1 of 2)



Ward 25, Western South (2 of 2)

Ward 25

Legend

■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

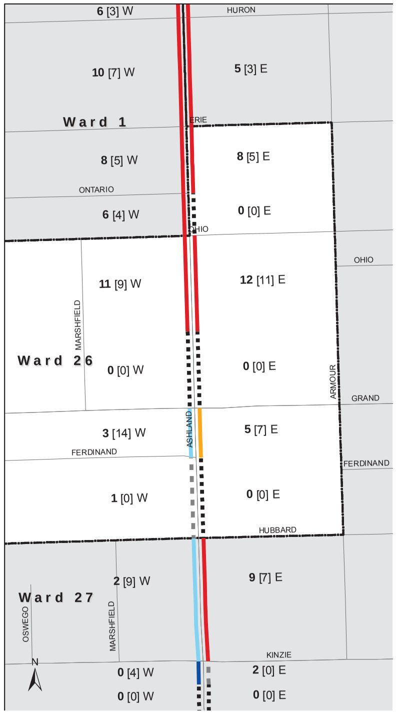
5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

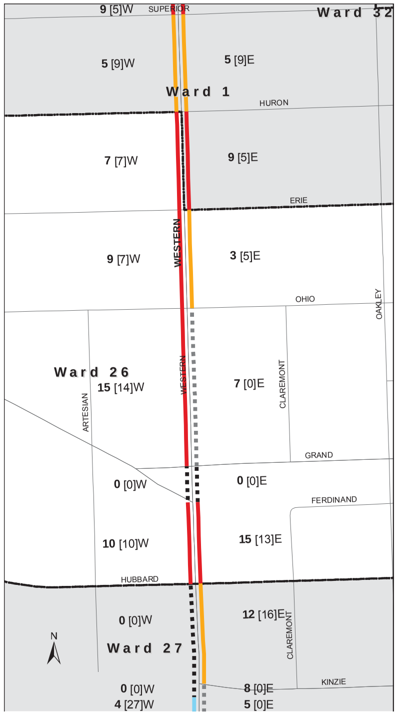
🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □

Ward 25	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	440	358	167	269	151
Utilization		81%	38%	61%	34%
Ashland	229	198	97	137	92
Utilization		86%	42%	60%	40%

Ward 26



Ward 26, Ashland



Ward 26, Western

Legend

▪ ▪ No Parking Zone

▪ ▪ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

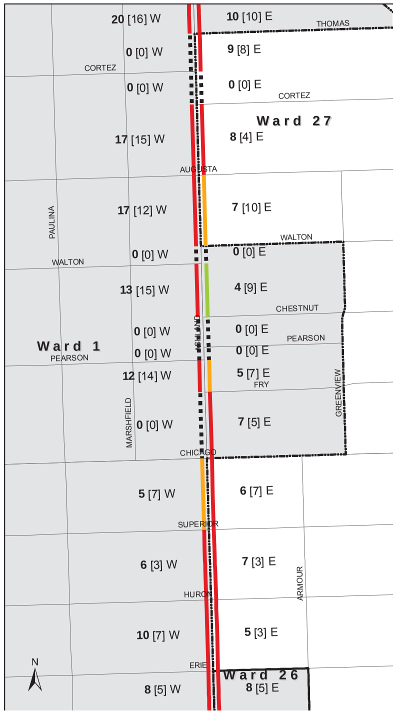
Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □

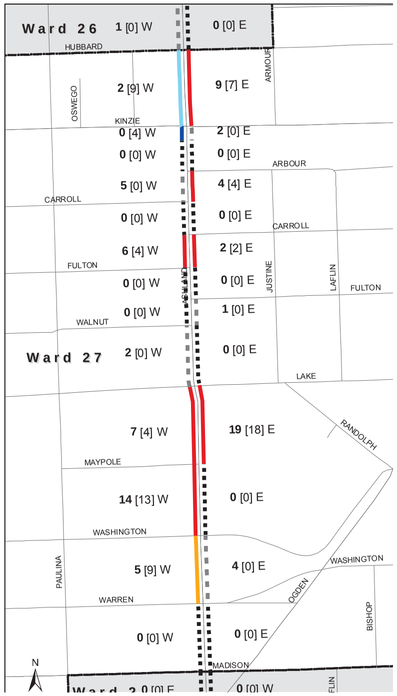
Ward 26	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	61	72	43	46	29
Utilization		118% *	70%	75%	48%
Ashland	55	51	24	37	27
Utilization		93%	44%	67%	49%

*Note: Number of vehicles observed > assumed number of spaces available

Ward 27



Ward 27, Ashland North (1 of 2)



Ward 27, Ashland South (2 of 2)

Legend

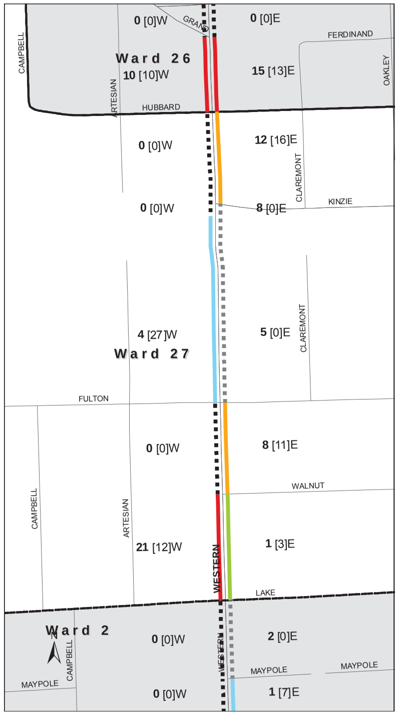
▪ ▪ No Parking Zone

▪ ▪ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □



Ward 27, Western

Ward 27

Legend

▪▪ No Parking Zone

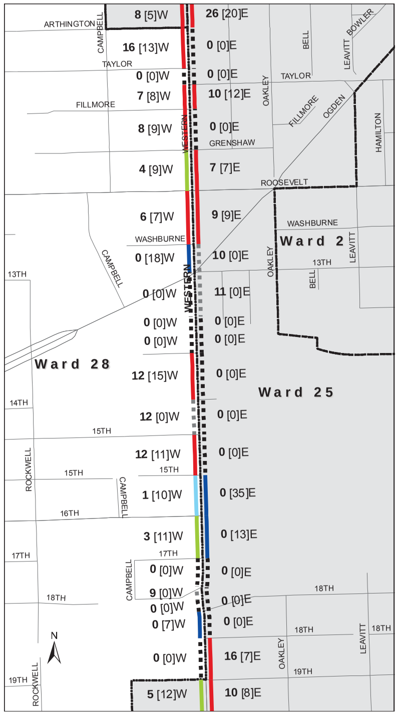
▪▪ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □

Ward 27	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	69	19	23	17	10
Utilization		28%	33%	25%	14%
Ashland	169	160	82	148	69
Utilization		95%	48%	88%	41%



Ward 28

Ward 28

Legend

▪▪ No Parking Zone

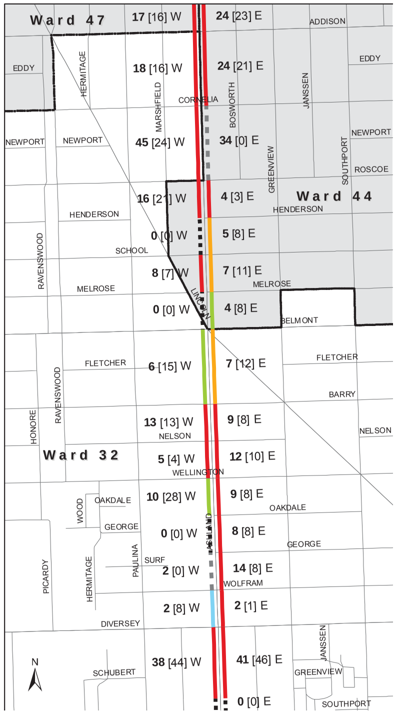
▪▪ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

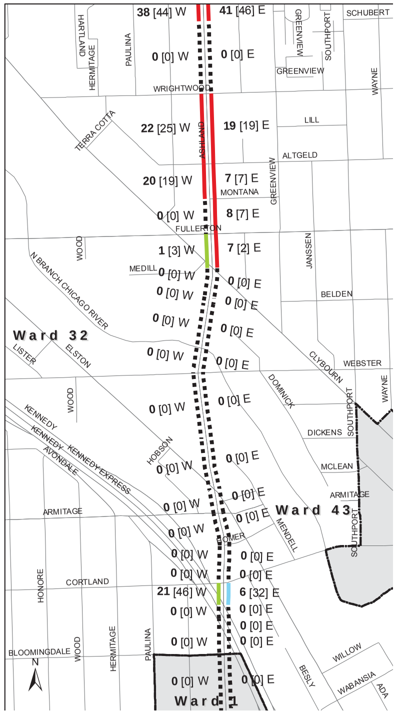
🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □

Ward 28	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	177	174	79	119	72
Utilization		98%	45%	67%	41%



Ward 32, Ashland North (1 of 2)

Ward 32



Ward 32, Ashland South (2 of 2)

Legend

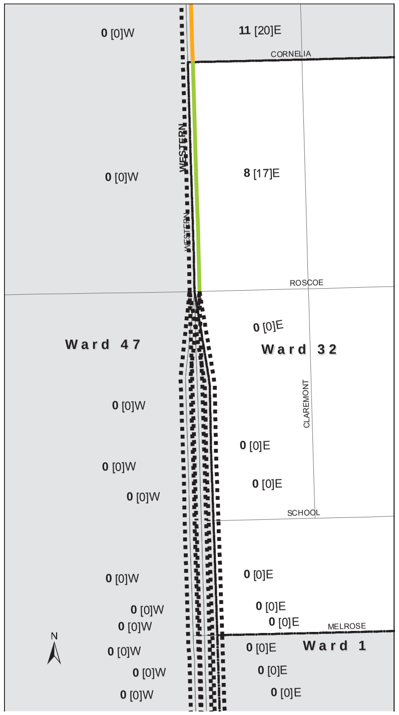
■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

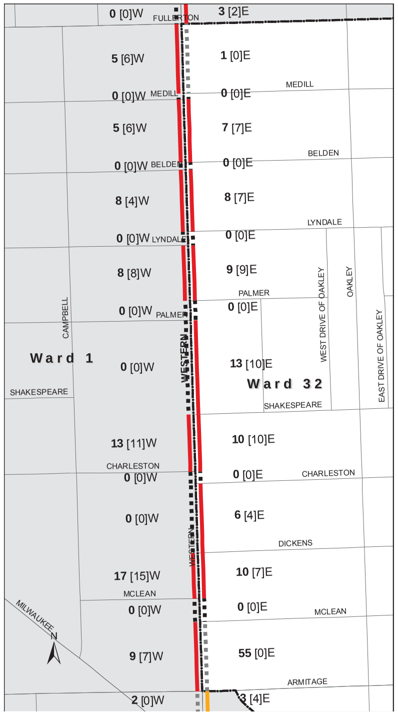
Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □



Ward 32, Western (1 of 3)

Ward 32



Ward 32, Western (2 of 3)

Legend

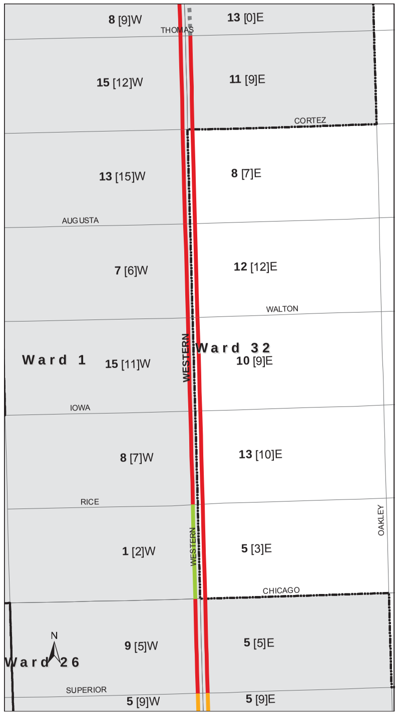
■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □



Ward 32, Western (3 of 3)

Ward 32

Legend

▪ ▪ No Parking Zone

▪ ▪ Vehicle in No Parking Zone

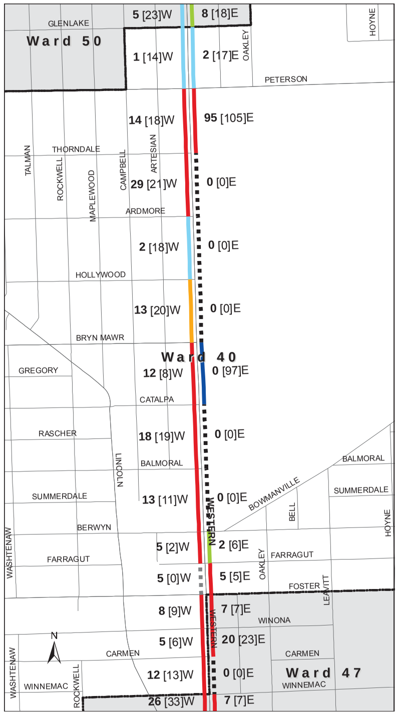
5 Maximum Spaces Used
[10] Total Spaces Available
W West-side of corridor
E East-side of corridor

Maximum Utilization

🟦 0%
🟦 1% - 25%
🟩 26% - 50%
🟧 51% - 75%
🟥 76% - 100%

Ward 32	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	262	277	159	210	153
Utilization		106% *	61%	80%	58%
Ashland	450	379	236	318	239
Utilization		84%	52%	71%	53%

*Note: Number of vehicles observed > assumed number of spaces available



Ward 40

Ward 40

Field observations found that a number of parked vehicles between Berwyn and Peterson were damaged or impaired vehicles. It appears that a nearby Auto Body Repair Shop may be parking excess vehicles on the street. These vehicles have a significant impact on space utilization in Ward 40. The main office appears to be located at 5808 N. Western Ave.

Legend

▪ ▪ No Parking Zone

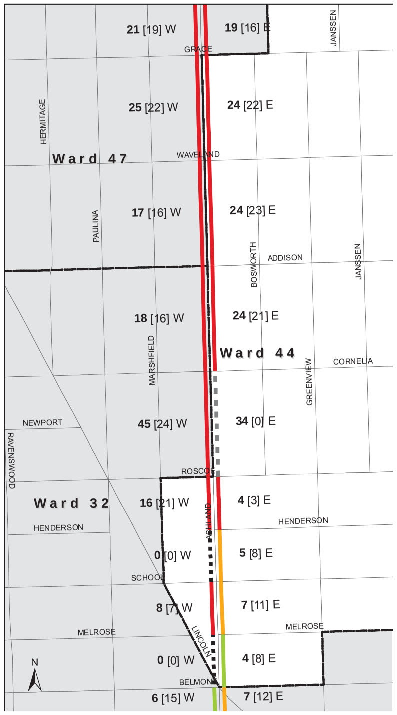
▪ ▪ Vehicle in No Parking Zone

5 Maximum Spaces Used
[10] Total Spaces Available
W West-side of corridor
E East-side of corridor

Maximum Utilization

🟦 0%
🟦 1% - 25%
🟩 26% - 50%
🟧 51% - 75%
🟥 76% - 100%

Ward 40	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	435	277	198	239	191
Utilization		64%	46%	55%	44%



Ward 44

Ward 44

Legend

■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

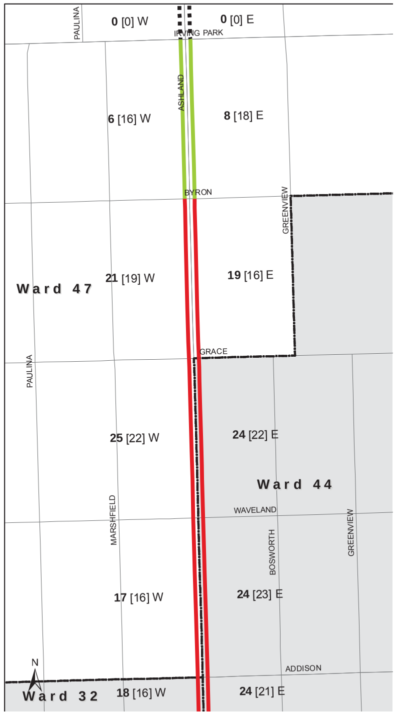
5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □

Ward 44	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Ashland	209	255	155	213	165
Utilization		122% *	74%	102% *	79%

*Note: Number of vehicles observed > assumed number of spaces available



Ward 47, Ashland

Ward 47

Legend

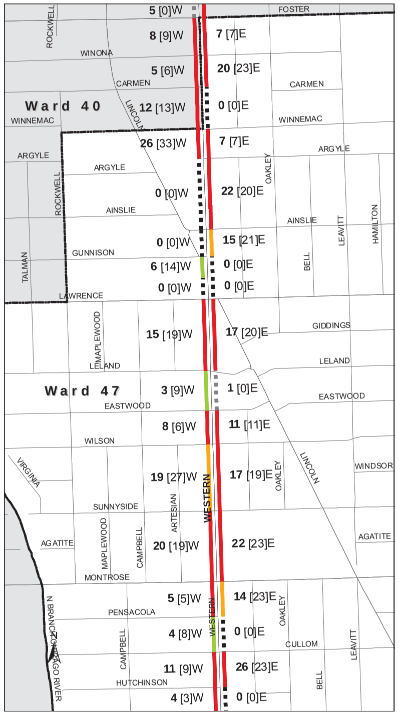
■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

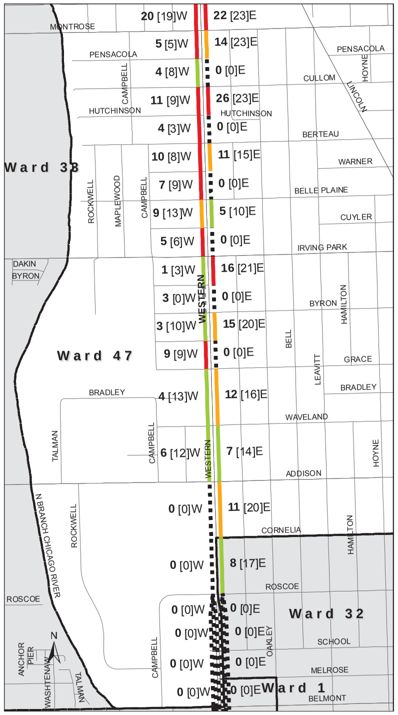
5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

🟦 0□
🟦 1□ - 25□
🟩 26□ - 50□
🟧 51□ - 75□
🟥 76□ - 100□ □



Ward 47, Western North (1 of 2)



Ward 47, Western South (2 of 2)

Ward 47

Legend

■ ■ No Parking Zone

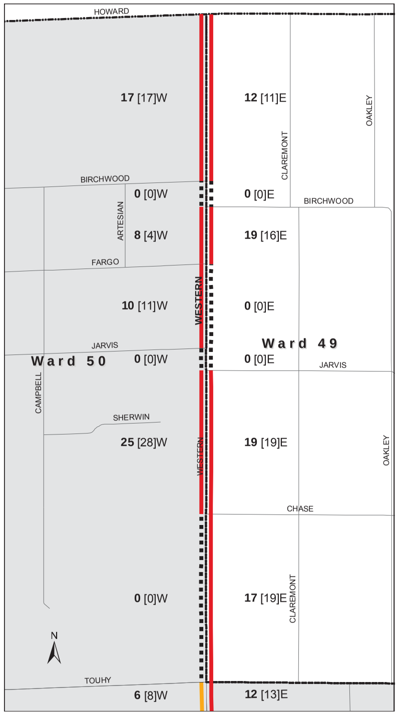
■ ■ Vehicle in No Parking Zone

5 Maximum Spaces Used
[10] Total Spaces Available
W West-side of corridor
E East-side of corridor

Maximum Utilization

🟦 0
🟦 1 - 25
🟩 26 - 50
🟧 51 - 75
🟥 76 - 100

Ward 47	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	633	430	242	402	238
Utilization		68%	38%	64%	38%
Ashland	148	142	104	134	115
Utilization		96%	70%	91%	77%



Ward 49

Ward 49

Legend

■ ■ No Parking Zone

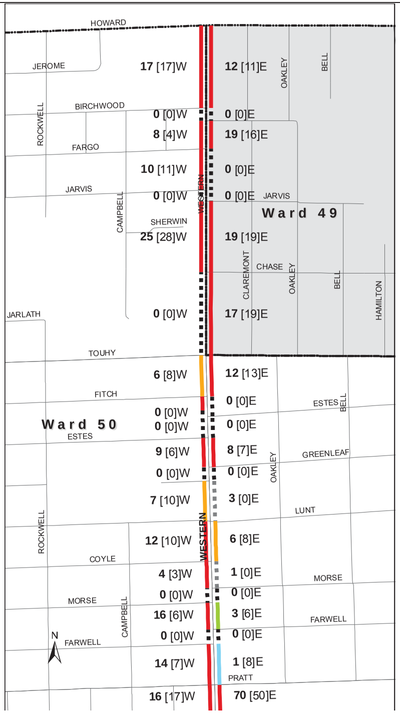
■ ■ Vehicle in No Parking Zone

5 Maximum Spaces Used
[10] Total Spaces Available
W West-side of corridor
E East-side of corridor

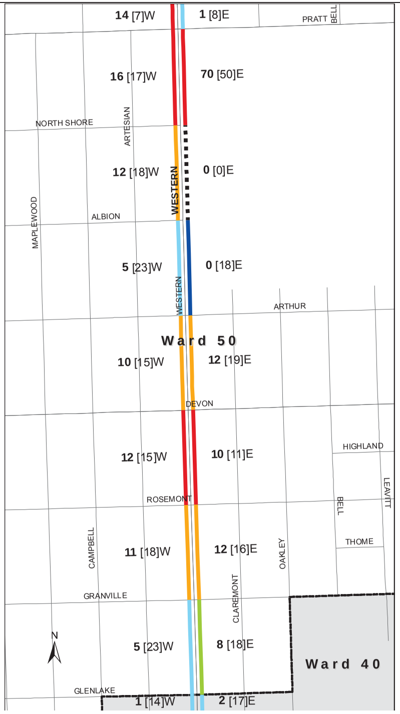
Maximum Utilization

🟦 0
🟦 1 - 25
🟩 26 - 50
🟧 51 - 75
🟥 76 - 100

Ward 49	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	133	125	84	104	81
Utilization		94%	63%	78%	61%



Ward 50, Western North (1 of 2)



Ward 50, Western North (2 of 2)

Ward 50

Field observations found that 40% - 80% of parked vehicles between Arthur and Pratt were taxi cabs. These vehicles have a significant impact on space utilization in Ward 50. The main Taxi Office and Dispatch appears to be located at 6500 N. Western Ave.

Legend

■ ■ No Parking Zone

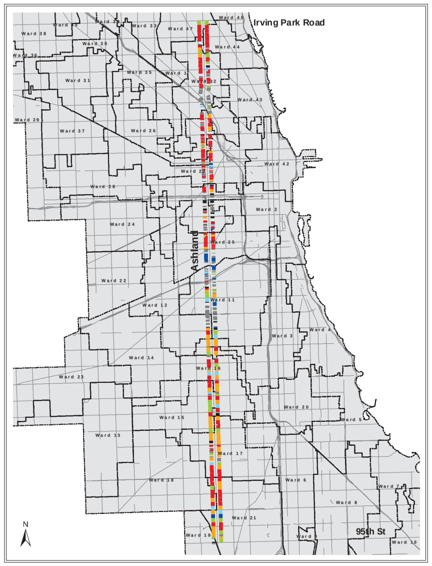
■ ■ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

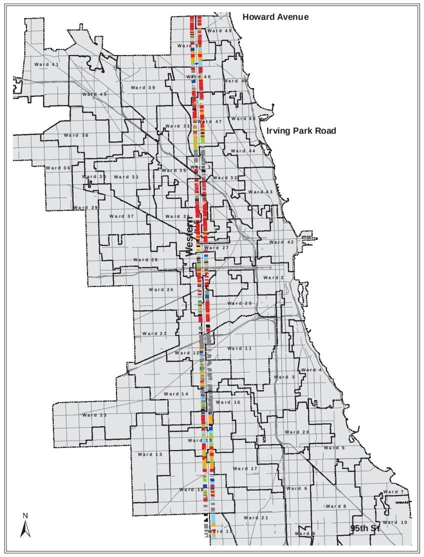
Maximum Utilization

- 🟦 0□
- ▬ 1□ - 25□
- 🟩 26□ - 50□
- 🟧 51□ - 75□
- 🟥 76□ - 100□ □

Ward 50	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	485	399	238	335	246
Utilization		82%	49%	69%	51%



Ashland Corridor



Western Corridor

Corridor

Legend

■ ■ No Parking Zone

■ ■ Vehicle in No Parking Zone

5 □Maximum Spaces Used
[10] □Total Spaces Available
W □West-side of corridor
E □East-side of corridor

Maximum Utilization

- 🟦 0□
- ▬ 1□ - 25□
- 🟩 26□ - 50□
- 🟧 51□ - 75□
- 🟥 76□ - 100□ □

Corridor	Available Spaces	Utilized Spaces			
		Weekday Maximum	Weekday Average	Weekend Maximum	Weekend Average
Western	4370	3666	1710	3048	1546
Utilization		84%	39%	70%	35%
Ashland	3676	3016	1215	2839	1301
Utilization		82%	33%	77%	35%

Appendix B
Sample data collection field record form

Run#1

Ashland Avenue - Irving Park Rd to 95th St

Surveyor Name	Anna
Date	07/29/2012

			Parking Spaces Occupied				
notes	time	West Curbline	#	#	East Curbline	time	notes
	7:36am	**Irving Park**			**Irving Park**	7:34am	
			0	4			
		Byron			Byron		
			19	14			
		Grace			Grace		
			21	18			
		Waveland			Waveland		
			13	20			
		Addison			**Addison**		
			10	16			
		Cornelia			Cornelia		
				14			
		CTA Brown Line			**CTA Brown Line**		
			18				
		Roscoe			Roscoe		
				1			
					Henderson		
			2	1			
		School			School		
			5	7			
					Melrose		
				0			
		Belmont / Lincoln			**Belmont / Lincoln**		
			0	0			
		Barry			Barry	7:30am	
			3	4			
		Nelson			Nelson		
			2	9			

APPENDIX D
Transit Operations Analysis Supporting Documentation

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *September 13, 2013*

Subject: *Transit Operations*

Prepared by: *CDM Smith, Inc.*

Introduction

This memorandum describes the assumptions and methodologies used in the Transit Operational Analysis section of the Environmental Assessment for the Ashland Avenue Bus Rapid Transit (BRT) Project.

Project Description

The proposed Ashland Avenue BRT Project (Build Alternative) would bring a new, premium mode of transit service to CTA's highest bus ridership route along Ashland Avenue from Irving Park Road in the north to 95th Street in the south (16.1 miles). The first phase (Phase 1) of design and construction would be located between Cortland Street in the north and 31st Street in the south (5.4 miles). While construction of BRT median stations, center running bus only lanes and Transit Signal Priority (TSP) upgrades would first be constructed in this area, limited stop service would be provided throughout the entire 16.1-mile corridor at the proposed BRT station locations using existing curbside bus stops until Phase 2 is constructed. Corridor design in Phase 2 would be similar to that in Phase 1 and would include center running dedicated BRT lanes and center median stations.

A trademark of BRT is increased frequency and capacity of service compared to regular bus service. The Ashland Avenue BRT Project is anticipated to operate at between five and fifteen minute headways in peak and off-peak hours, respectively. The BRT service would operate from 4:00 a.m. to 1:00 a.m., a span of service of 21 hours per day. CTA estimates that the total number of buses required to operate BRT peak and off-peak service with the proposed headways would be 12 vehicles (peak) and four vehicles (off-peak) in each direction for the entire 16.1-mile corridor.

Existing local CTA Bus Route #9 bus service would continue to operate in a similar manner as today when Phase 1 is implemented. Due to expected ridership shifts from Route #9 to the faster and more reliable BRT service, Route #9 frequency may be adjusted once the BRT service has matured. CTA is committed to maintaining Route #9 service to provide block-by-block local access as a complement to the BRT service. This configuration of service provides benefits to customers making both local and express transit trips.

There are 35 proposed BRT station locations that would be implemented approximately every half mile and at CTA rail stations to provide faster and more reliable service in the corridor, with fewer stops than the existing bus service. Route #9 service would continue to operate, stopping at every bus stop (approximately every one-eight mile) along the corridor.

Under the Build Alternative, improvements to pedestrian crossings and enhanced access to adjacent transit facilities would be provided at station locations, with increased amenities at BRT stations compared to local bus stops. These improvements to the pedestrian environment are proposed along with complete streets design considerations (i.e., designs that consider all users of the roadway), such as special sidewalk and curb design, to create an integrated and holistic transportation network in the corridor that not only accommodates all modes, but which would accommodate all users of the transit service and pedestrian environment. CTA and CDOT have both established complete streets design guidelines that would be incorporated into final design. CDOT's *Complete Streets Chicago Design Guidelines*[1] and CTA's *Transit Friendly Design Guide*[2] would be used to ensure that the design of stations and crossing fit the form and function of adjacent land uses and roadway typologies within the corridor.

Potential benefits to the transit system as a result of the Build Alternative which are discussed within the context of this EA include:

1. Travel Time and Reliability Changes
2. Changes to Transit Patronage and Demand
3. Station Access and Circulation

The following presents the summary of findings in each of these areas. Implementation of the Build Alternative is anticipated to improve travel time, reliability and increase the number of transit users along the corridor. Station access and pedestrian circulation are also improved through implementation of median stations and enhanced pedestrian space and amenities. Increases to traffic around stations is not anticipated to result from implementation of median stations and in most cases, and increased pedestrian accessibility would be provided to account for enhanced transit use resulting from the proposed Build Alternative and address pedestrian circulation needs for passengers transferring from other adjacent rail and bus services along the corridor.

Travel Time and Reliability Changes

Three transit operational factors were estimated and evaluated to determine anticipated travel time and reliability changes, as summarized in **Table 1**. The following provides details on how these measures were calculated and summarizes the benefits to travel time and reliability anticipated through implementation of the Build Alternative.

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[1] Chicago Department of Transportation, Complete Streets Chicago Design Guidelines, 2013.
http:□www.cityofchicago.org□content□dam□city□depts□cdot□Complete□20Streets□CompleteStreetsGuidelines.pdf

[2] Chicago Transit Authority, Transit-Friendly Development Guide: Station Area Typology, 2009.
http:□www.cityofchicago.org□dam□city□depts□zlup□Planning□and□Policy□Publications□Transit□Friendly□Development□Guide□CTA□Typology□Study.pdf

Table 1: Summary of Travel Time and Reliability Changes

	Average Bus Speed (mph)	Bus Travel Time (Minutes)	Bus Reliability (Seconds)
No-Build Alternative	8.7	17.2	43
Build Alternative	15.9	9.4	22
Net Change	**83%**	**45.3%**	**48.8%**

Bus Speed

Average bus speed estimates were developed based on the Build Alternative conceptual design elements and service plan and bus speed information from *Transit Cooperative Research Program (TCRP) Report 118 – Bus Rapid Transit Practitioner's Guide* (Transportation Research Board 2007). BRT service speeds for the Build Alternative were then compared to No-Build existing bus speeds along each corridor to estimate bus speed changes. Existing bus speeds for the Route #9 average 8.7 miles per hour. Implementation of the Build Alternative would increase average speed along the corridor to 15.9 miles per hour, an increase in bus speed up to 83 percent compared to existing local bus service on the corridor. Additional bus speed increases would result from buses operating in dedicated lanes, increased station spacing compared to current local bus stops, the potential for off-board fare collection to further reduce bus dwell times, transit signal prioritization improvements, left-turn removal at intersections and traffic signal optimization.

Route #9 would continue to operate in a general purpose traffic lane and stop at all existing local bus stops. Existing Route #9 average speed is 8.7 miles per hour during peak periods and is less than projected general purpose traffic average speed of 12.8 mile per hour during peak periods. Route #9 may experience minor delays associated with the reduction in general purpose traffic lanes. However, these minor impacts to local bus speeds would be offset by the significant increases in speed of the BRT service that would provide riders with more efficient options to reach their destinations.

Travel Time

The average trip length for Ashland Avenue is 2.5 miles, and is based on CTA travel survey information collected in October 2010. Average bus travel times were estimated by multiplying average trip lengths by the preliminary average bus speed estimates for the Build Alternative. Estimated travel times were then compared to existing, No-Build bus travel times along the corridor to estimate bus travel time changes, Existing travel times along the corridor are 17.2 minutes. Bus travel time under the Build Alternative is anticipated to decrease to 9.4 minutes for a typical 2.5-mile trip, representing an approximately 45 percent travel time savings for passengers of the BRT service. These time savings are realized from BRT operating in center running dedicated lanes and having fewer stops than the local bus service.

Route #9 travel time is anticipated to maintain similar travel time for riders since impacts to local bus speed are anticipated to be minimal and to be offset by the significant gains in travel time associated with the Build Alternative.

Reliability

2010 bus reliability data from CTA for existing local bus service (No-Build Alternative) was obtained for this analysis and bus reliability estimates were developed based on the conceptual design elements and service plans for the Build Alternative and using bus reliability information from *TCRP Report 118 – Bus Rapid Transit Practitioner's Guide* (Transportation Research Board 2007). These elements were compared to No-Build bus reliability along each corridor to estimate bus reliability changes. Under typical existing conditions (No-Build), additional wait time compared to published schedule is estimated at less than one minute (43 seconds). Under the Build Alternative, bus reliability is projected to increase by almost 50 percent, with extra wait times decreasing to within 22 seconds.

Route #9 will continue to operate in a general purpose traffic lane and stop at all existing local bus stops. Route #9 may experience minor delays, leading to a minor reduction in bus reliability associated with the reduction in general purpose traffic lanes. However, the impact to the overall Route #9 reliability will be less than significant due to the substantial increases to overall transit service (BRT and local bus) with the Build Alternative.

In sum, the Build Alternative would result in overall increased bus speeds and greater reliability along the corridor through the implementation of center running, dedicated lanes for the BRT service, limited stop locations for BRT service, level boarding with the potential for off-board fare collection at BRT stations to further reduce bus dwell times, TSP improvements, left-turn removal at intersections, and traffic signal optimization.

Implementation of the Build Alternative is anticipated to result in

- improved travel times,
- greater schedule reliability,
- easier transfers,
- shorter wait times,
- greater customer satisfaction,
- improved pedestrian features, and

- increased system operating efficiencies.

The BRT service would operate with frequent service which would reduce travel delays, improve transit accessibility, and enhance the land use and transportation relationship. These service improvements are expected to positively benefit transit patronage by attracting more choice riders, i.e., those that have a choice on whether to drive an automobile or use transit service but elect to take a trip on transit.

Changes to Transit Patronage and Demand

Two ridership factors were estimated and evaluated to determine potential changes to transit patronage and demand resulting from the Build Alternative, including estimated daily boarding changes and mode split changes. The sources and methodology for these estimates are included below along with a summary of benefits to transit patronage and demand resulting from the Build Alternative.

Daily Boarding Changes

Daily boarding estimates were developed based on output from CMAP travel demand model runs that modeled the transportation operational conditions (headways and speeds) for Build Alternative. The No-Build Alternative modeling assumptions were based on the regional modeling inputs used for the 2010 analysis year in the air quality conformity analysis completed by CMAP in spring 2012 (C12 Q1). The No-Build Alternative model represents the existing roadway network and transit service levels. The model output was compared to No-Build daily boardings along each corridor to estimate daily boardings changes. Initial estimates of daily boardings along the Ashland Avenue corridor indicated an increase of 29 percent with implementation of the Build Alternative (for both local bus and BRT service). Refinements utilizing most current CMAP model data show that up to 41 percent increases to daily boardings could occur as a result of the project. These estimated daily boardings increases would result from increased transit capacity, speed, timing and reliability.

Mode Split

Mode split estimates (for local bus and the proposed BRT) were developed based on output from CMAP travel demand model runs that modeled the different vehicle operational conditions for the Build Alternative. The No-Build Alternative modeling assumptions were based on the regional modeling inputs used for the 2010 analysis year in the air quality conformity analysis completed by CMAP in Spring 2012 (C12 Q1). The No-Build Alternative model represents the existing roadway network and transit service levels. The model output was then compared to No-Build mode splits along the corridor to estimate transit mode split increases. CMAP data indicates an existing transit mode split of 14 percent and would increase to 26 percent as a result of implementation of the Build Alternative. Estimated transit mode split increases would result from increased transit ridership and decreased roadway traffic volume capacity.

Station Access and Pedestrian Space

Three station access and pedestrian space factors were estimated and evaluated to determine potential impacts of the Build Alternative, including pedestrian space, raised median space, and sidewalk buffers. The methodology and a summary of results are described below. In sum, these factors indicate that enhancements to overall access for pedestrians would be realized through implementation of the Build Alternative.

Pedestrian Space

Pedestrian space calculations were developed at proposed BRT station intersections along the corridor to represent net gains in sidewalk space and raised median space that could be realized by the Build Alternative and are summarized in **Table 2**. Pedestrian space calculations were developed at proposed BRT station intersections along the corridor to represent net gains in sidewalk and raised median space that could be realized by the Build Alternative. The proposed Build Alternative would expand the sidewalk width and install a median at stations by 52 percent.

Table 2: Pedestrian Space Evaluation

	No-Build	Build Alternative
Sidewalk Width on Both Sides (Ft.)	27	29
Station Median Width (Ft.)	0	12
Total Pedestrian Space Width (Ft.)	27	41
Change vs. No-Build	n/a	52%

Raised Medians

Raised medians represent the linear feet of raised medians along the corridor alignment between station locations. Raised median estimates were developed based on the conceptual roadway alignment design for the Build Alternative and are shown in **Table 3**. Raised median stations lengths are anticipated to increase by over 173 percent compared to existing conditions. Because raised medians would restrict pedestrian crossings at unsignalized intersections, mid-block crossings would be installed. At these locations, a break in the median would provide a crossing point and a refuge (waiting area) for pedestrians crossing Ashland Avenue.

Table 3: Raised Medians (Between Stations) Evaluation

	No-Build	Build Alternative
Medians (linear ft.)	29,331	80,180
Change vs. No-Build	n/a	173.4%

Sidewalk Buffers

The sidewalk buffer was assumed to be in place or to be installed along portions of the corridor where travel lanes would directly abut the sidewalk in order to provide pedestrians a landscaped streetscape barrier between traffic and the sidewalk. A parking lane would also serve as a de facto buffer, since parked vehicles and the lane itself segregate pedestrians from traffic. Sidewalk buffer length estimates (linear feet of sidewalk buffers, including parking lane and landscaping, between sidewalks and vehicle travel lanes) were developed based on the conceptual roadway alignment and intersection layout design for the Build Alternative, and results are shown in **Table 4**.

Table 4: Sidewalk Buffers Evaluation

	No-Build	Build Alternative
Sidewalk Buffers (linear ft.)	112,485	150,420
Change vs. No-Build	n/a	34%

Compared to the No-Build existing conditions along the corridor, a 34 percent increase to sidewalk buffers would be provided through implementation of the Build Alternative. These increases would enhance the pedestrian environment and support safe pedestrian circulation in the corridor.

References

Transportation Research Board. 2007. Transit Cooperative Research Program (TCRP) Report 118 – Bus Rapid Transit Practitioner's Guide. Available at: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_118.pdf. Accessed: May 17, 2013.

Appendix E-1: Land Use and Economic Development Technical Memorandum

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *August 8, 2013*

Subject: *Land Use and Economic Development*

Prepared by: CDM Smith, Inc.

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and the Federal Transit Authority (FTA), is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue Bus Rapid Transit (BRT) Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

- Construction of 35 median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

Purpose

This memorandum analyzes the potential impacts of the Ashland Avenue BRT Project on land use and economic development. The types of impacts considered in this analysis include conflicts with or disruptions to existing land uses; inconsistencies with local and regional plans, policies, and regulations; and future land use and economic development benefits and opportunities presented by the alternatives.

Land Use and Zoning

Regional and local planning bodies govern land use and zoning regulations. Within Chicago, the Chicago Metropolitan Agency for Planning (CMAP) as the regional planning body defines the regional planning principles for the study area, while the City of Chicago regulates land use policies and zoning within their local jurisdictional boundaries. As such, existing land use, zoning, overlay districts and relevant land use plans were evaluated within a half mile buffer of Ashland Avenue to determine compatibility with the proposed project. Full land use and zoning analysis details may be found in **Table 1** and **Table 2**.

Table 1: Existing Land Use by Category within half mileof Ashland Avenue Corridor

Existing Land Use Category	Sum of Acres	Percent of Total
Residential	5,552.9	51.6%
Retail/Service	39.7	0.4%
Office/Professional	71.9	0.7%
Urban Mix	1,370.6	12.7%
Other Commercial	70.3	0.7%
Institutional (Government, medical, education, etc)	686.1	6.4%
Industrial, Warehousing and Wholesale Trade	1,557.0	14.5%
Transportation, Communication, and Utilities	528.6	4.9%
Open Space	410.4	3.8%
Vacant or Under Construction	344.2	3.2%
Water	125.1	1.2%
Total	**10,757**	**100.0%**

Source: Cook County Assessor, 2012

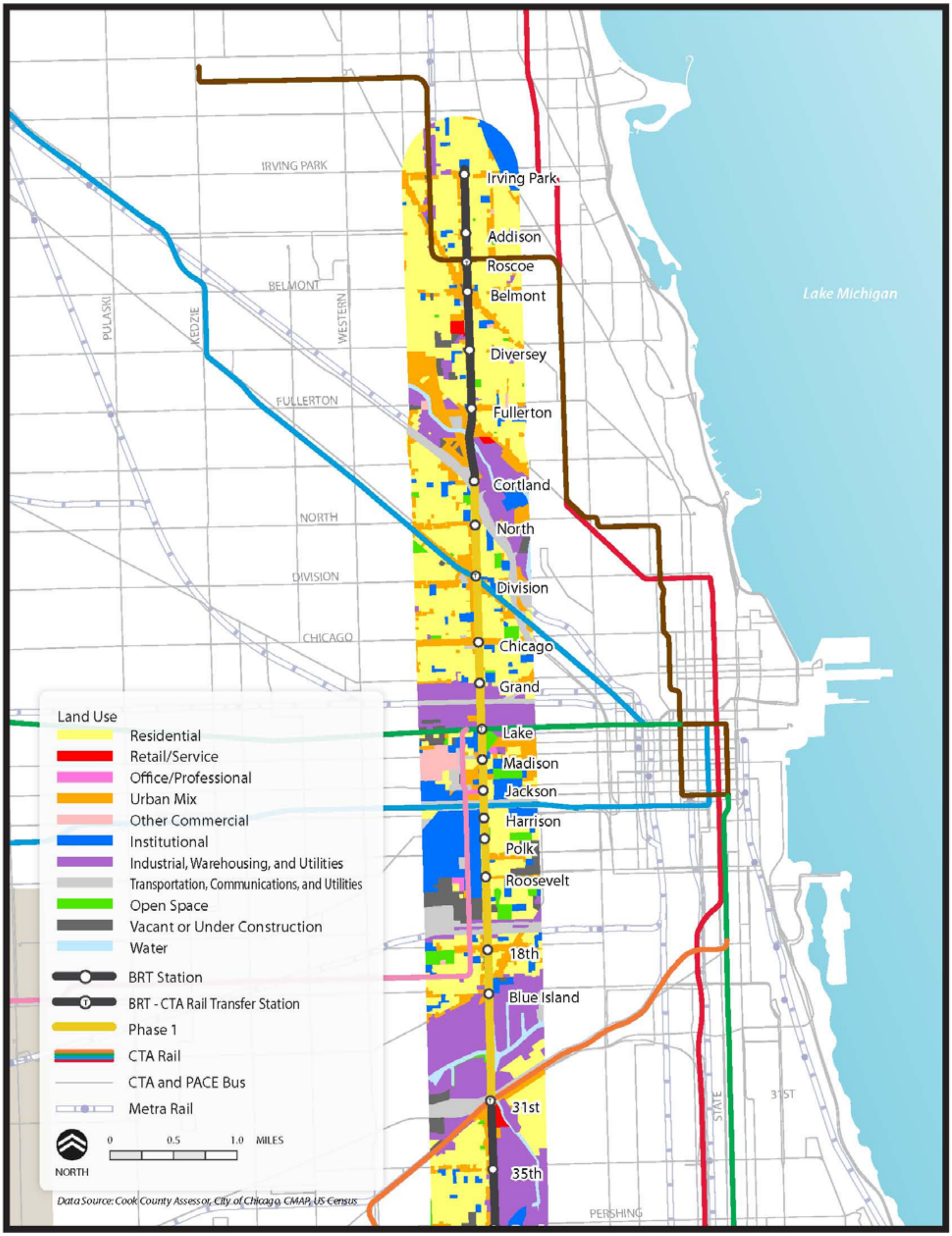
Table 2: Zoning Districts within Half Mile of Ashland Avenue Corridor

Zoning Districts	Sum of Acres	Percent of Total
RS - Residential Single-Unit	4062.63	37.6%
RT - Residential Two-Flat, Townhouse and Multi-Unit	1347.64	12.5%
RM - Residential Multi-Unit	149.72	1.4%
B1 - Neighborhood Shopping	285.72	2.6%

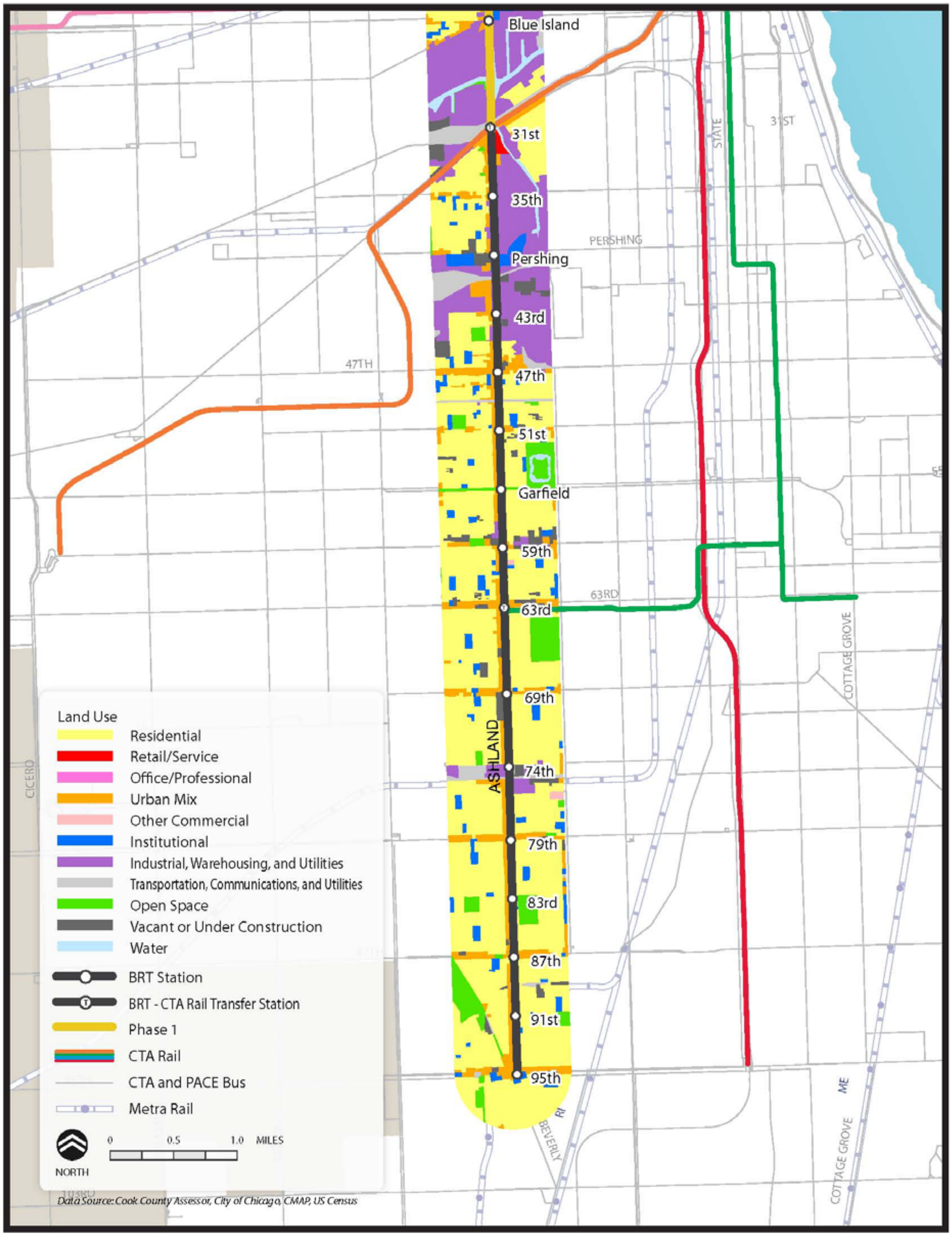
Zoning Districts	Sum of Acres	Percent of Total
B2 - Neighborhood Mixed-Use	16.58	0.2%
B3 - Community Shopping District	636.59	5.9%
C1 - Neighborhood Commercial District	420.5	3.9%
C2 - Motor Vehicle-Related Commercial	125.79	1.2%
C3 - Commercial, Manufacturing and Employment	11.98	0.1%
DR - Downtown Residential	0.05	0.0%
DS - Downtown Service	0.15	0.0%
DX - Downtown Mixed-Use	0.12	0.0%
M1 - Limited Manufacturing/Business Park	284.55	2.6%
M2 - Light Industry	264.69	2.4%
M3 - Heavy Industry	109.18	1.0%
PMD - Planned Manufacturing District	1446.61	13.4%
POS - Parks and Open Space	363.98	3.4%
PD - Planned Development	1277.79	11.8%
Total	**10,804**	**100.0%**

Existing land uses and zoning in the corridor were determined to be consistent with the proposed project. Land use within the study area is shown in **Figure 1** and is linked with the City's geography and historical pattern of urban development. Ashland Avenue is a predominantly commercial corridor with retail, business industrial and institutional land uses lining the street. Residential uses are located throughout the area and include a mix of medium density single-family, multi-family and mixed use development. Commercial and retail uses are located along arterial east-west streets as well as Ashland Avenue.

Figure 1: Existing Land Use (Half Mile Buffer)



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census



Data Source: Cook County Assessor, City of Chicago, CMAP, US Census

Institutional uses, such as schools, are located throughout the study area and are typically located within residential neighborhoods. In addition, the Illinois Medical District is located along Ashland Avenue, between Jackson Avenue and Roosevelt Road. The medical district has the highest concentration of hospitals within the City of Chicago, and includes medical research facilities, a biotechnology business incubator and universities. It is a major employment and educational center along the corridor.

Two waterways flow through the study area, including the south branch of the Chicago River and the Sanitary and Ship Canal, which connects the Des Plaines River and the Chicago River. Industrial uses flank these waterways, which historically provided water transport that supported industrial activities. Similarly, industrial uses are located along the Metra commuter rail corridors that pass through the study area, including the Union Pacific, BNSF and Heritage Corridor lines. Some industrial uses in these areas have converted to retail and commercial uses over time.

Overlay Districts

Tax Increment Financing (TIF) districts

The Ashland Avenue Corridor intersects with 20 of the city's 160 Tax Increment Financing (TIF) districts in the city, shown in **Figure 2**. These TIFs are a special funding tool used by the City of Chicago to promote public and private investments in infrastructure improvements in given areas as growth and development occur.[1] The majority of these TIFs are focused on mixed use residential and commercial development and encompass most retail oriented streets along Ashland Avenue. In addition to these mixed-use focused TIFs, there are also five industrial corridor TIFs that are concentrated near the three major rail lines and three interstate highways that pass through the corridor; existing access to and from interstate highways would be retained in these areas as part of the proposed project. The Ashland Avenue corridor also intersects three previously designated Empowerment Zones and two of the City’s three Enterprise Communities, shown in **Figure 3**. The Empowerment Zones/Enterprise Communities program is a federal, state, local government partnership for stimulating comprehensive renewal--particularly economic growth and social development--in distressed urban neighborhoods across the nation.[2] Combined, these areas provide a number of tax and business incentives in the corridor that contribute to the current and planned land use and transportation environments.

Historic Districts

Within a half mile of the Ashland Avenue corridor there are eight historic districts, including:

- Armitage-Halsted
- Longwood Drive

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[1] City of Chicago, Tax Increment Financing Program, http:□www.cityofchicago.org□city□en□depts□dcd□supp□info□tax□increment□financingprogram.html.

[2] U.S. Department of Housing and Urban Development, Community Renewal Initiative, http:□portal.hud.gov□hudportal□HUD?src□□program□offices□comm□planning□economicdevelopment□programs□rc

- Beverly/Morgan Park Railroad Station
- East Village District
- Jackson Boulevard
- Milwaukee Avenue District
- Ukrainian Village
- Wicker Park

Figure 2: Tax Increment Financing (TIF) districts

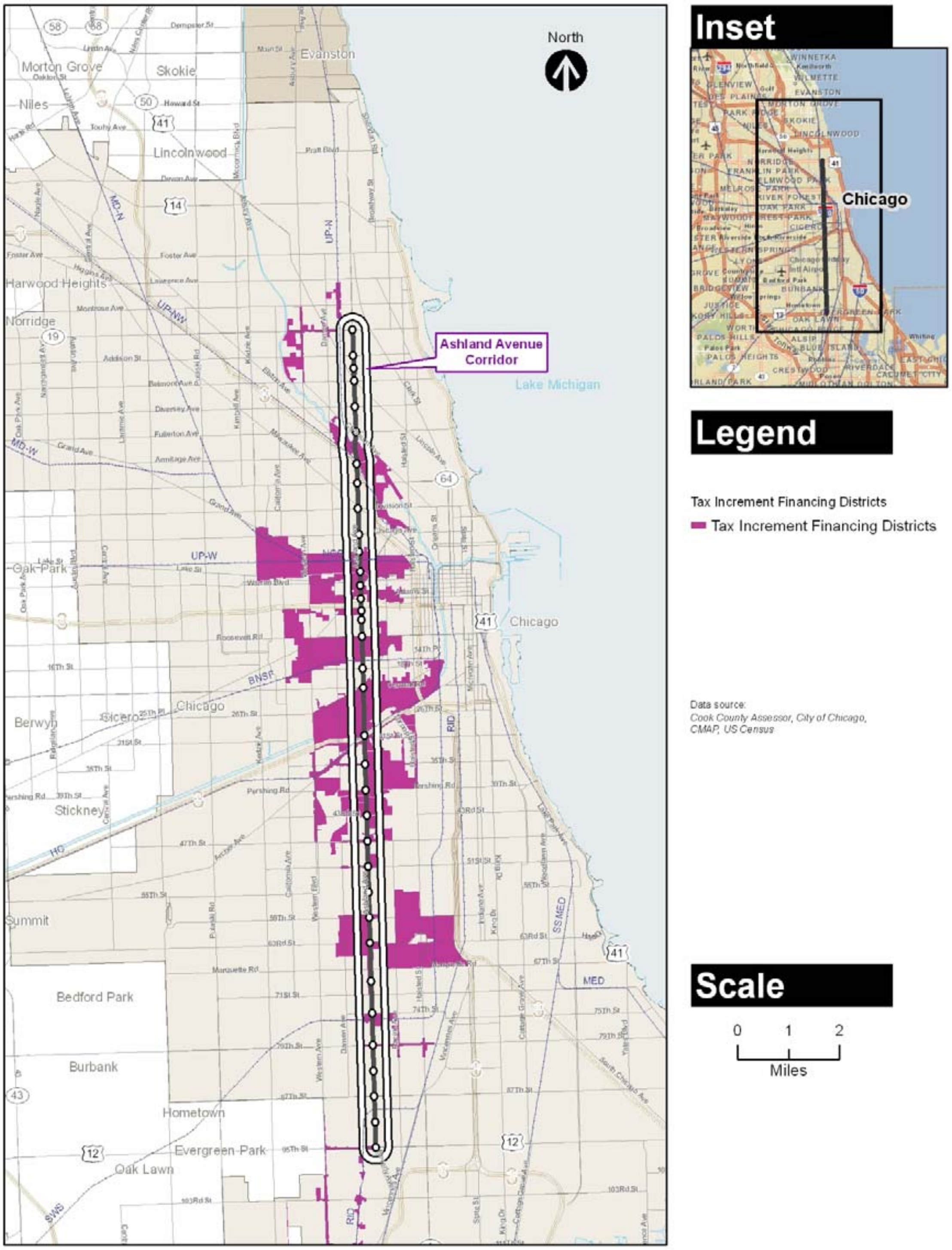
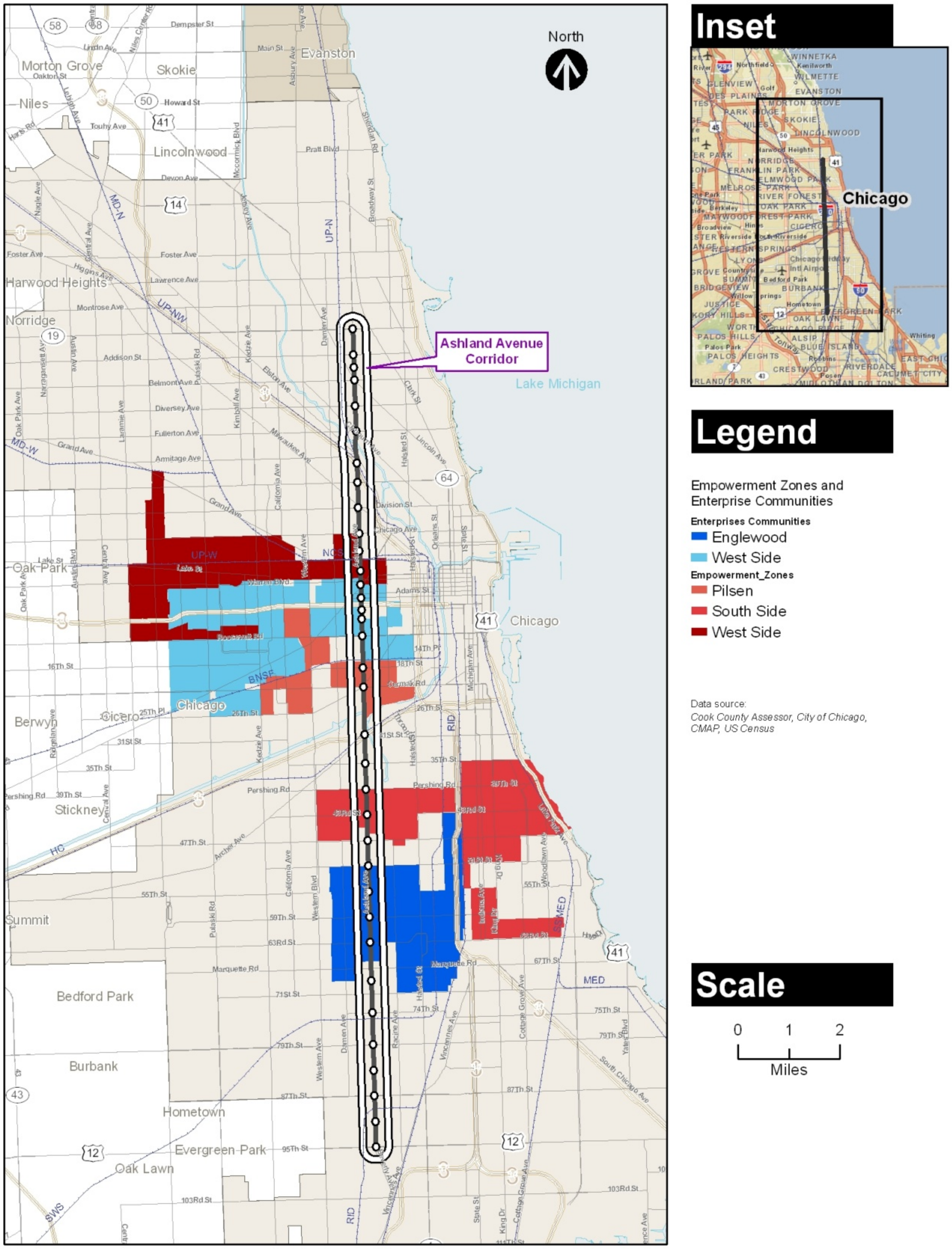

North
Ashland Avenue Corridor
Lake Michigan
Evanston
Morton Grove
Skokie
Niles
Lincolnwood
Harwood Heights
Norridge
Oak Park
Berwyn
Cicero
Chicago
Stickney
Summit
Bedford Park
Burbank
Hometown
Evergreen Park
Oak Lawn
UP-N
UP-NW
MD-N
MD-W
UP-W
BNSF
HC
RID
SS MED
MED
SWS
Inset
Chicago
Legend
Tax Increment Financing Districts
▬ Tax Increment Financing Districts
Data source:
Cook County Assessor, City of Chicago, CMAP, US Census
Scale
0
1
2
Miles

Figure 3: Empowerment Zones and Enterprise Communities



Data source:
Cook County Assessor, City of Chicago, CMAP, US Census

Industrial Corridors

Within a ½ mile of the Ashland Avenue corridor there are five industrial corridors, shown in **Figure 4**, including:

- North Branch
- Kinzie
- Western / Ogden
- Pilsen
- Stockyards

Relevant Land Use Plans

The City of Chicago also has a number of Community Plans and Open Space Plans which were reviewed for relevance to the study area. Relevant, recently completed land use plans to the study area include the Chicago River Corridor Development Plan, Reconnecting Neighborhoods Plan, and the Near Northwest Side Plan. These plans provide a future vision for specific portions of the corridor. A review of these plans indicates no conflicts between these land use plans and the proposed action and details on these plans are provided below. In addition to existing plans, in May 2013, the Chicago City Council approved a BRT Land Use Development Plan that is proposed specifically to analyze and identify improvements to local land use policies to support the eventual development of BRT along Ashland Avenue.

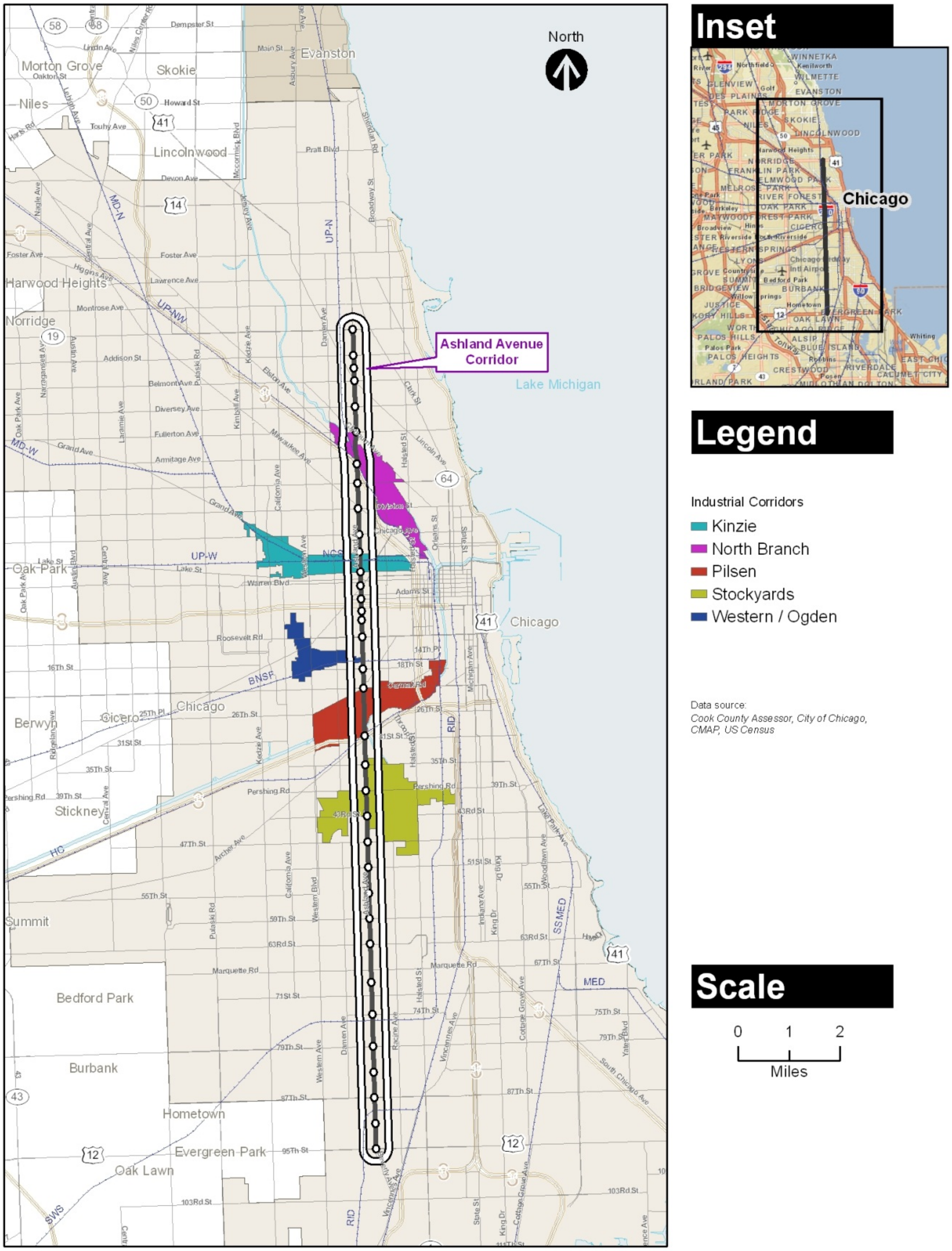
Chicago River Corridor Development Plan

The Chicago River Corridor Plan (2005) guides development and planning along the River, with specific goals related to paths and greenways, public access, habitat conservation, recreation and economic development. The Chicago River crosses Ashland Avenue in two locations and intersects with three planning areas defined in the plan: Reach Four, Reach Five, and Reach Eight. Reaches four and five encompass the northern crossing and Reach eight covers the southern crossing.

Reconnecting Neighborhoods

Reconnecting Neighborhoods (2009) is part of the City's efforts to integrate affordable housing into its neighborhoods. The plan includes three focus areas, one of which—Near West—is intersected by the Ashland Avenue. The plan provides suggested improvements to transit, pedestrian accessibility, urban design, and commercial development. An attachment at the end of this document provides a synopsis of suggested improvement strategies.

Figure 4: Industrial Corridors



Data source:
Cook County Assessor, City of Chicago, CMAP, US Census

Near Northwest Side Plan

The Near Northwest Side Plan (2002) intersects with the Ashland Avenue corridor between east-west Kinzie Street and Chicago Avenue. The plan aims to complete the open space network, enhance the transit system, and guide new development. Key transit recommendations include:

- Potential new CTA Green Line stations
- Enhanced CTA Blue Line Station entrances
- Strengthened pedestrian connections between CTA and Metra Stations
- Improvements to bus stops such as new shelters, benches, signage and lighting
- Implementation of the Central Area Plan transportation recommendations

Environmental Impacts

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed and no impacts to current land use or zoning would occur. The No-Build Alternative would not further incentivize economic development in the corridor.

Ashland Avenue BRT Project

The proposed project would have no direct impacts on land uses in the corridor and is consistent with existing land use, zoning and relevant community land use plans. The City of Chicago is committed to the proposed effort and additional land use studies are proposed to identify further improvements to land use policies in the corridor to support development of the proposed project. In addition, the implementation of BRT would further support economic development plans by proving greater cohesion between land use and transportation. The BRT service and street enhancements could incentivize new transit oriented development (TOD) in the corridor, which would be consistent with zoning.

Appendix E-2: Neighborhoods and Communities Technical Memorandum

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *August 8, 2013*

Subject: *Neighborhoods and Communities*

Prepared By: CDM Smith, Inc.

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and the Federal Transit Authority (FTA), is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue Bus Rapid Transit (BRT) Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

- Construction of 35 median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

Purpose

This memorandum describes the socioeconomic characteristics, neighborhoods and community facilities that define the study area and documents potential impacts to neighborhoods and communities.

Socioeconomic Characteristics

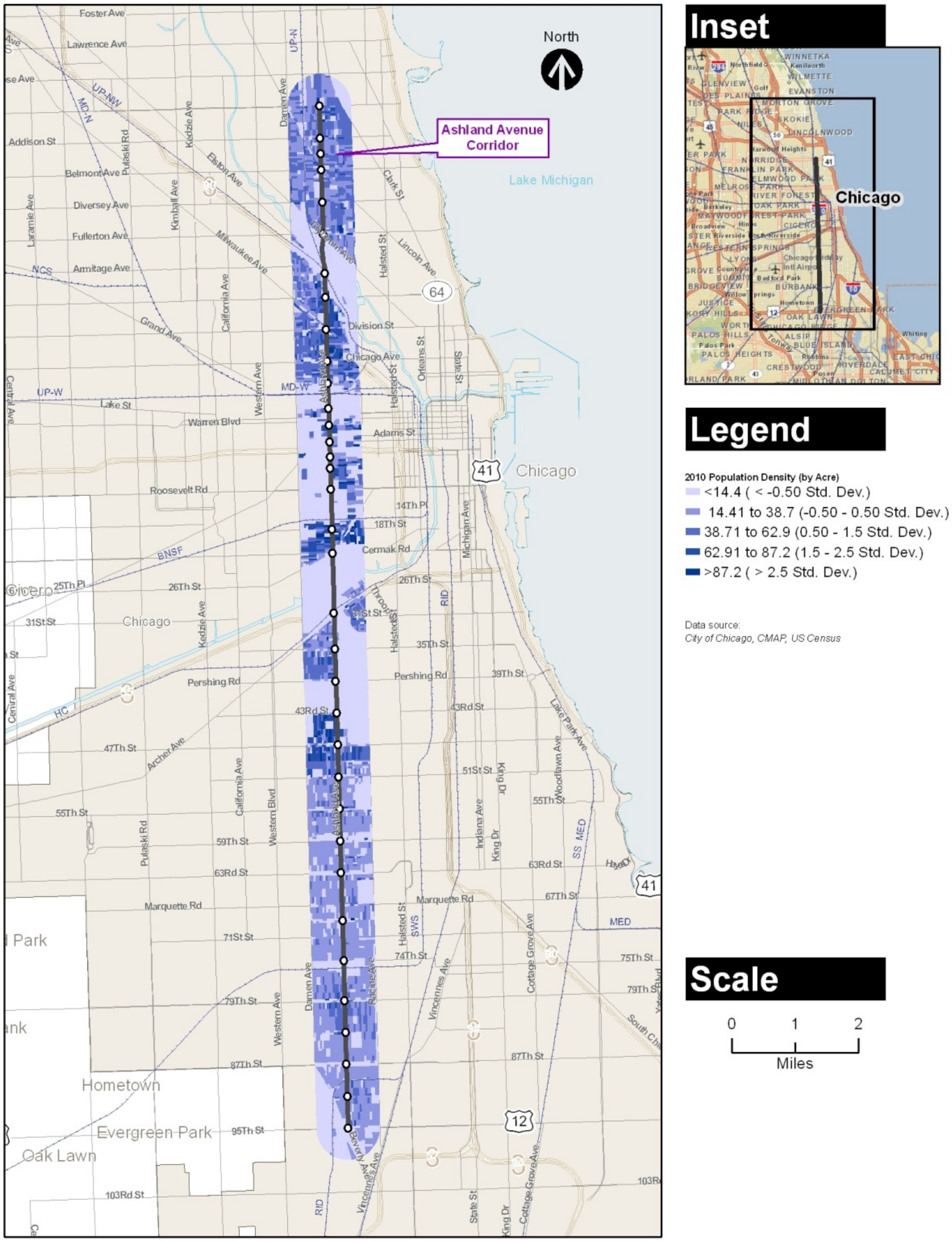
For this analysis, a demographic profile representing total populations within a half-mile buffer around the corridor were obtained. Demographic estimates were developed based on data from three primary sources: 2010 Decennial Census (Summary File 1), 2010 American Community Survey (five-year summary), and Chicago Metropolitan Agency for Planning (CMAP) 2009 Travel Demand Model traffic analysis zone (TAZ) data for 2040. A summary of this demographic data within the study area is shown on **Table 1.** Additional detailed data and maps related to the demographics analysis, including comparisons of the corridor to city-wide demographics are located in **Figure 1** through **Figure 10**. For reference, CMAP TAZs and US Census Tracts within a half mile buffer are shown in **Figure 11** and **Figure 12**, respectively.

There are currently 232,000 people and over 90,000 households located within a half mile of the Ashland Avenue Corridor, equating to approximately nine percent of the population of the city as a whole. Approximately one in four households within walking distance to the Ashland Avenue corridor do not have access to a vehicle and rely upon transit for their travel needs. While the racial composition of the corridor is predominantly minority (55.7%), minority population densities in the corridor (11.8 people per acre) are somewhat lower than for the city as a whole (12.4 people per acre). Limited English proficiency residents along the corridor make up approximately three percent of the population and are similar to city-wide averages as well. Low-income family densities are also similar (0.8 people per acre) to city-wide low-income densities (0.7 people per acre).

Table 1: Ashland Avenue Demographic Profile (Half Mile Buffer)

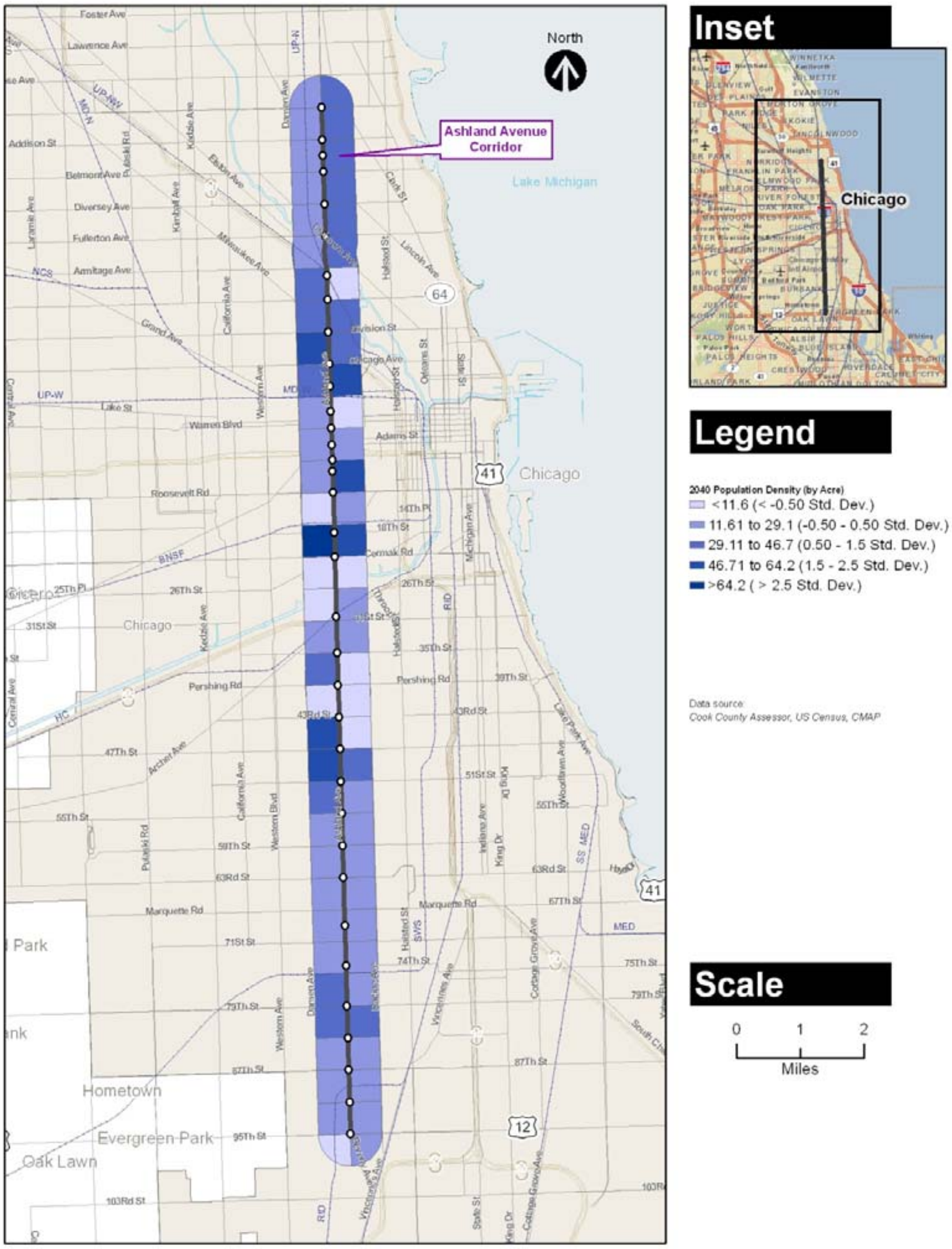
Demographic Factor	No-Build
2010 Population	232,051
2010 Population Density (Pop/Acre)	21.5
2040 Population	286,779
2040 Population Density (Pop/Acre)	26.5
2010 Households	90,781
2010 Household Density (Households/Acre)	8.4
2040 Households	108,405
2040 Household Density (Households/Acre)	10.0
2010 Minority	127,550
2010 Minority Density (Minority Pop/Acre)	11.8
2010 Low-Income Families	9,031
2010 Low-Income Families Density (Low-Income Families/Acre)	0.8
2010 Youth	21,518
2010 Youth Density (Youth Pop/Acre)	2.0
2010 Senior	28,031
2010 Senior Density (Senior Pop/Acre)	2.6
2010 Limited English Proficiency [LEP]	6,894
2010 LEP Density (LEP Pop/Acre)	0.6
2010 No Vehicles Available (Households)	22,538
2010 No Vehicles Available Density (No Vehicle Households/Acre)	2.1

Figure 1: 2010 Population (Half Mile Buffer)



Description: 2010 Population divided by acres.
Source: 2010 Decennial Census (100% data)
Data Table: P1 (Population)
Geography: Census Block
Universe: Total Population
Data source reference: 2010 Decennial Census, Data Table P1 (Population).

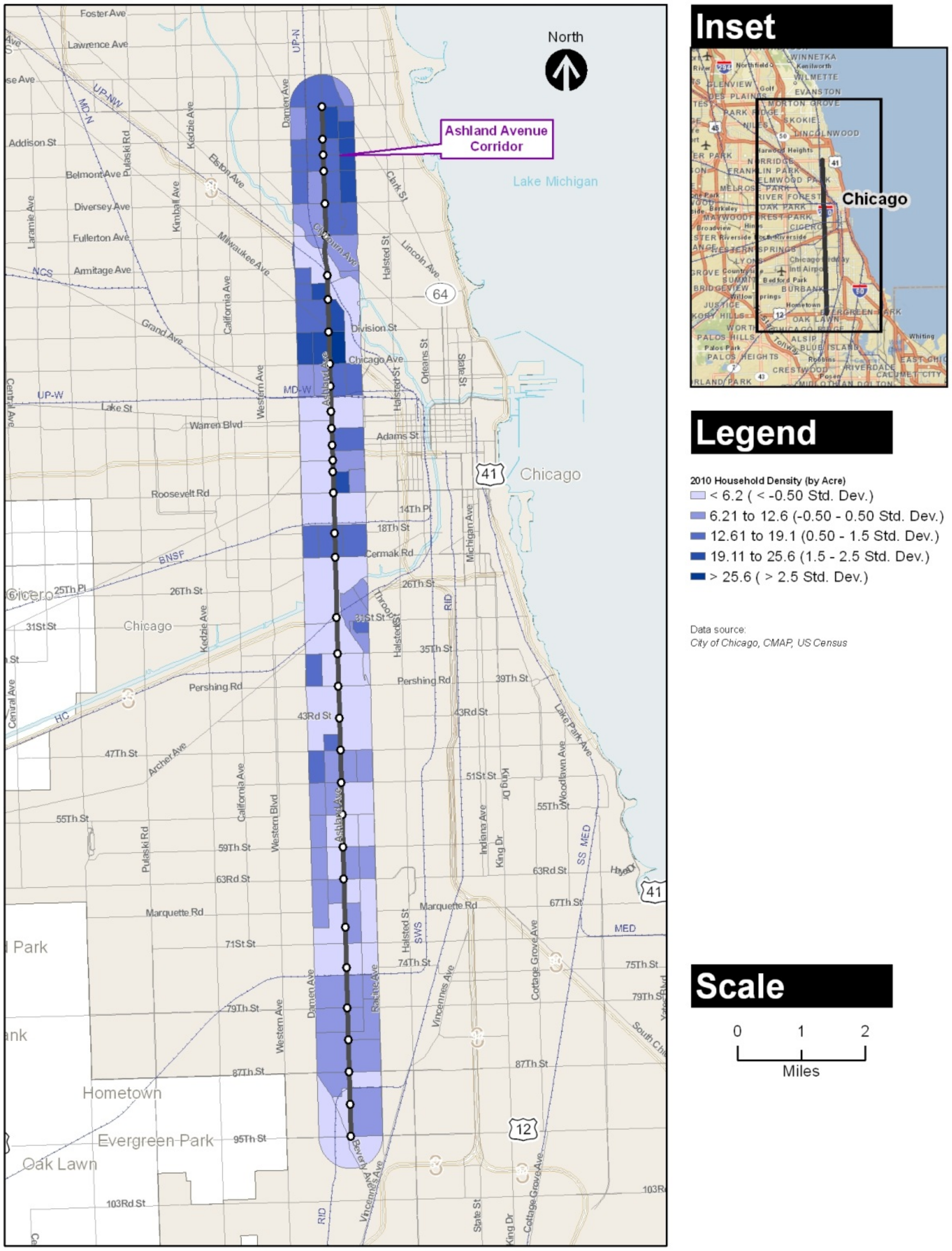
Figure 2: 2040 Population (Half Mile Buffer)


North
Ashland Avenue Corridor
Lake Michigan
Chicago
Inset
Chicago
Legend
2040 Population Density (by Acre)
<11.6 (< -0.50 Std. Dev.)
11.61 to 29.1 (-0.50 - 0.50 Std. Dev.)
29.11 to 46.7 (0.50 - 1.5 Std. Dev.)
46.71 to 64.2 (1.5 - 2.5 Std. Dev.)
>64.2 (> 2.5 Std. Dev.)
Scale
0
1
2
Miles

Data source:
Cook County Assessor, US Census, CMAP

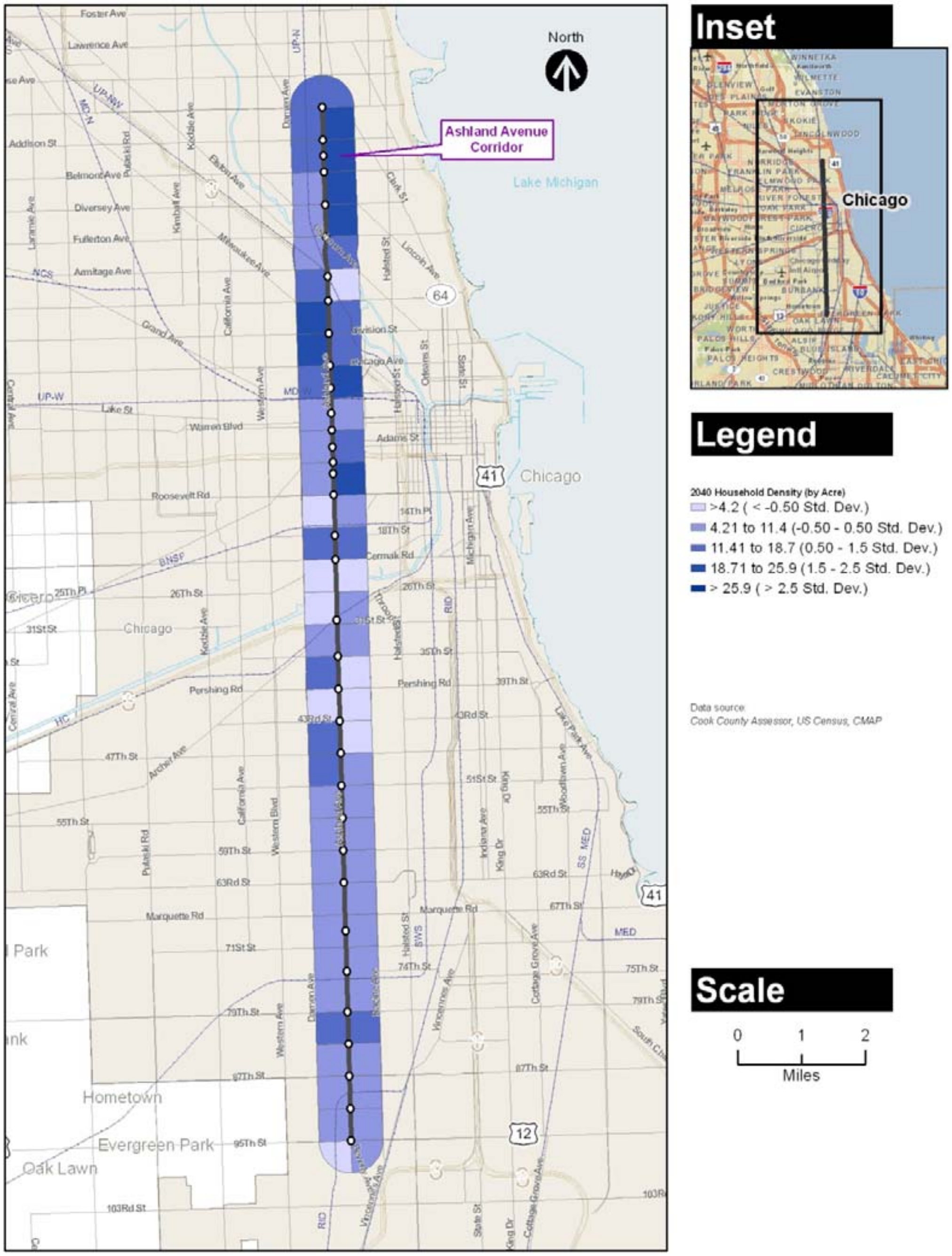
Description: 2040 Population divided by acres.
Source: CMAP Model
Data source reference: CMAP Model Population.

Figure 3: 2010 Households (Half Mile Buffer)



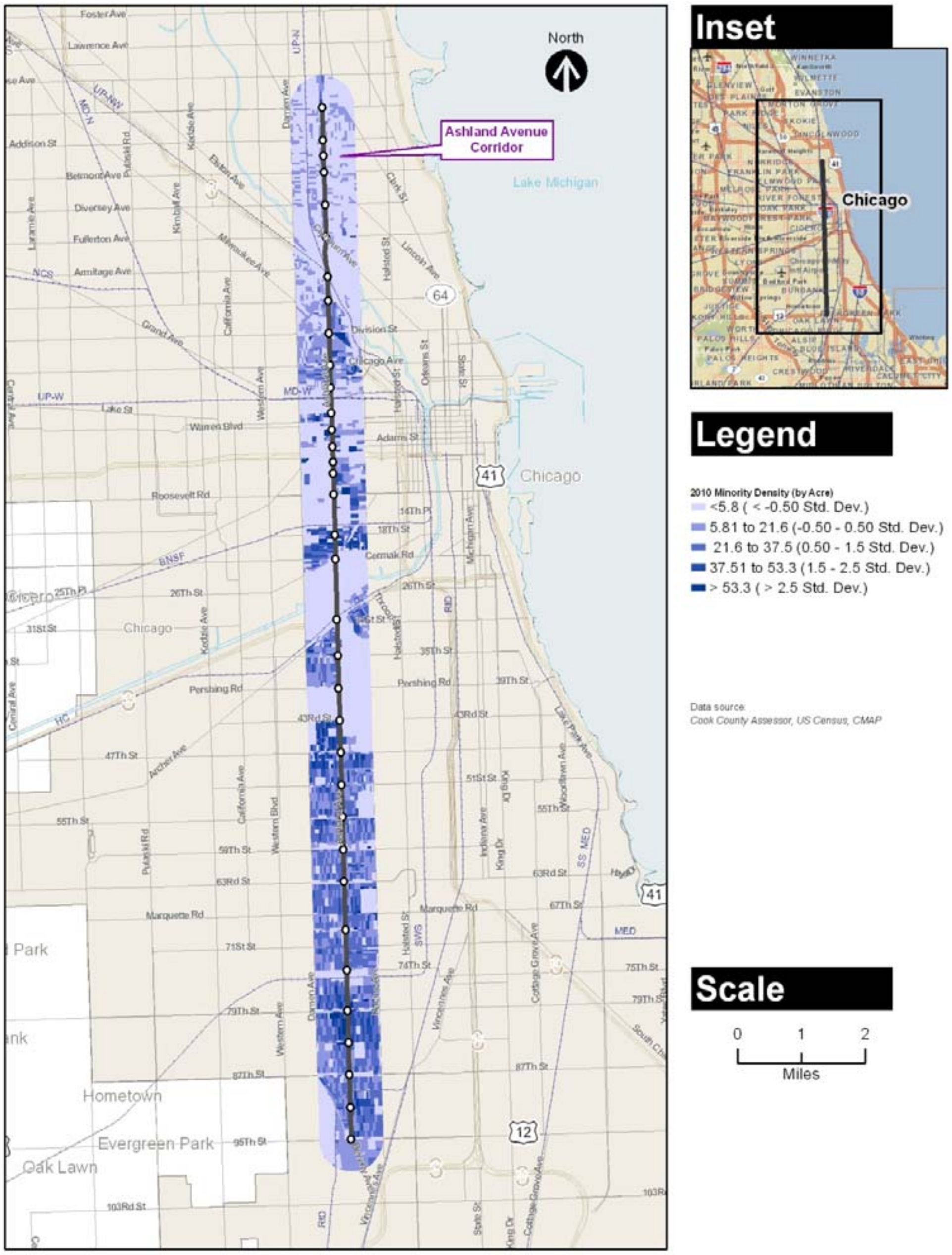
Description: 2010 Households divided by acres.
Source: 2010 Community Survey (5-year estimates)
Data Table: B25001 (Housing Units)
Geography: Census Block
Universe: Total Population
Data source reference: 2010 American Community Survey 5-year estimates, Data Table B25001 (Housing Units).

Figure 4: 2040 Households (Half Mile Buffer)



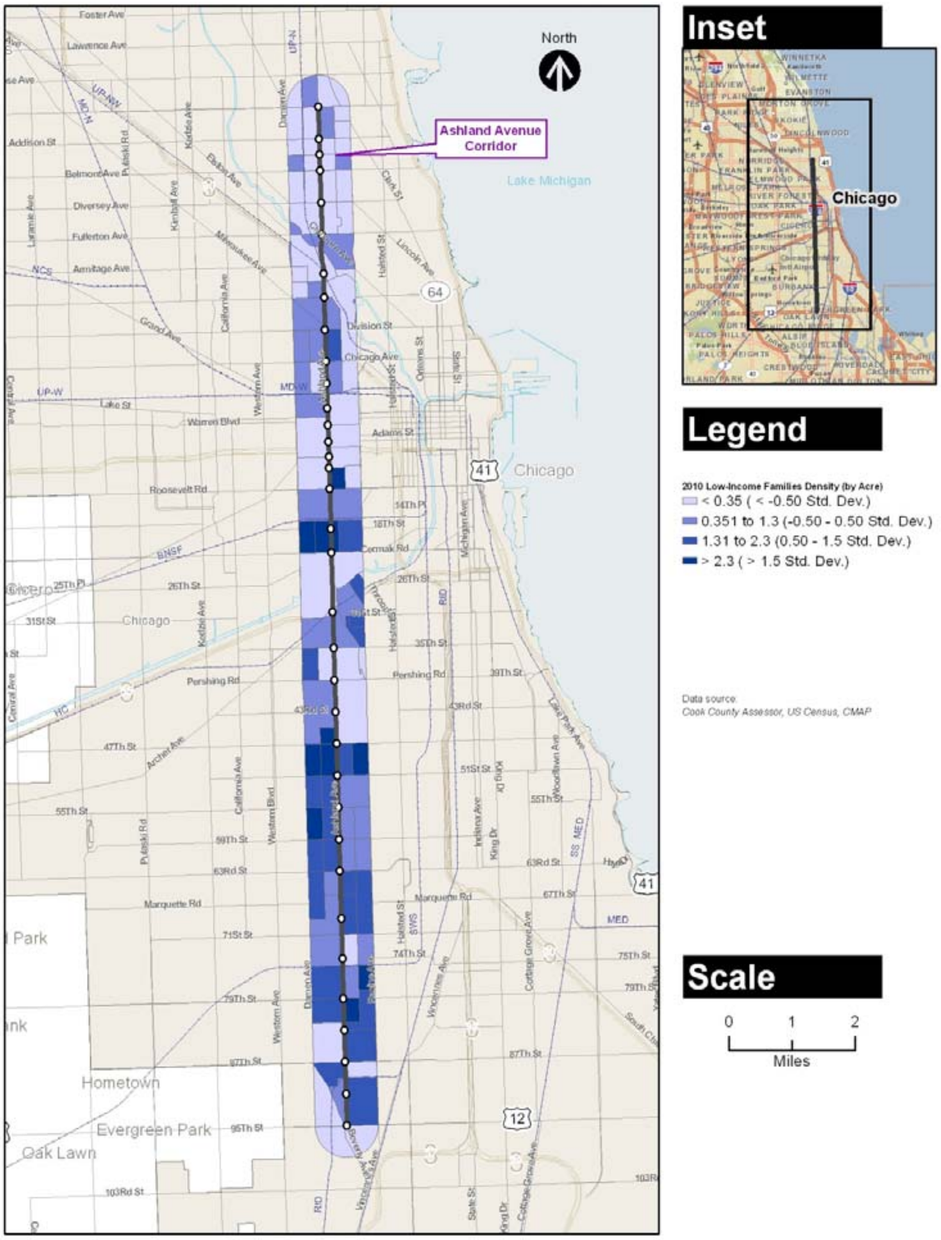
Description: 2040 Households divided by acres.
Source: CMAP Model
Data source reference: CMAP Model Households

Figure 5: 2010 Minority (Half Mile Buffer)



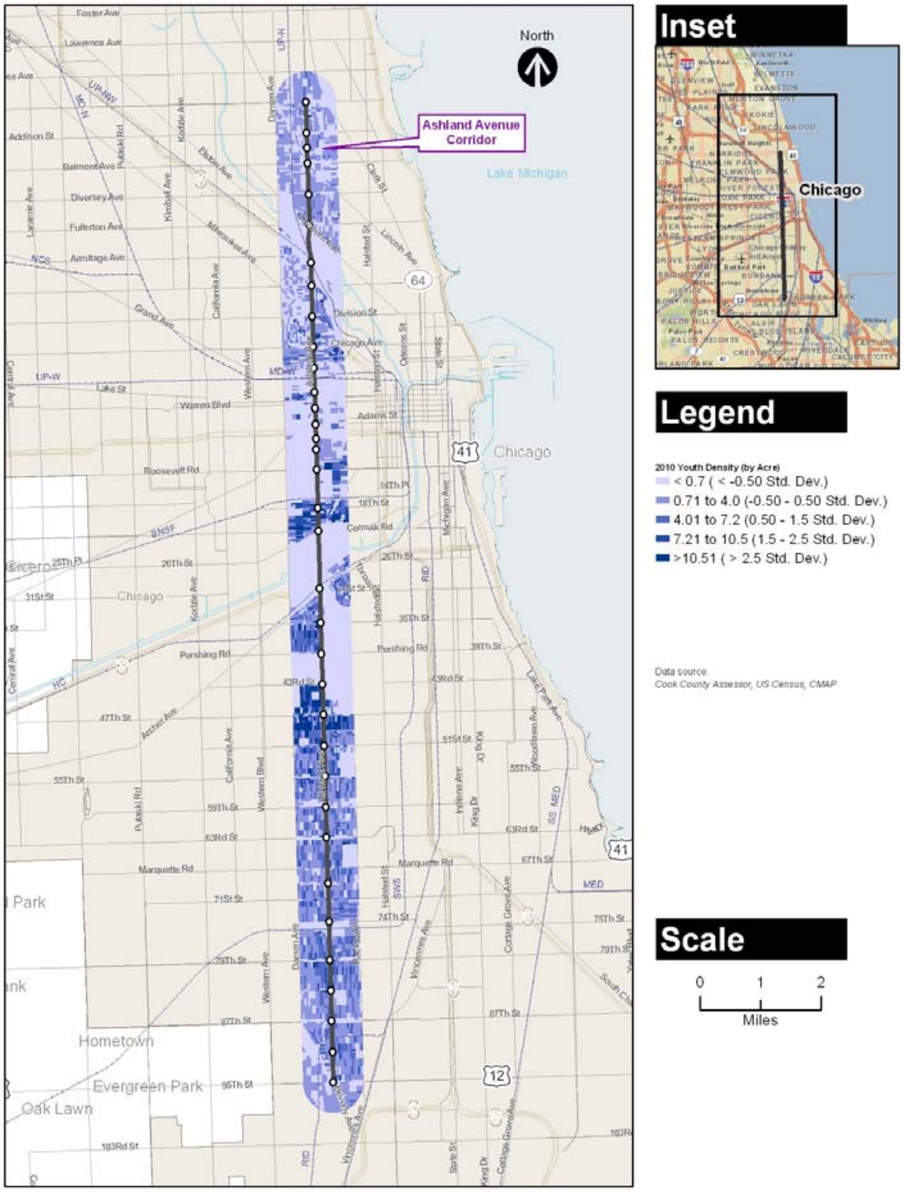
Description: Total non-white population, including Latino/Hispanic and multiple-race population, divided by acres.
Source: 2010 Decennial Census (100% data)
Data Table: P5 (Hispanic or Latino origin by race)
Geography: Census Block
Universe: Total Population
Data source reference: 2010 Decennial Census, Data Table P5 (Hispanic or Latino origin by race).

Figure 6: 2010 Low-income Families (Half Mile Buffer)


North
Ashland Avenue Corridor
Lake Michigan
Chicago
Inset
Chicago
Legend
2010 Low-Income Families Density (by Acre)
< 0.35 (< -0.50 Std. Dev.)
0.351 to 1.3 (-0.50 - 0.50 Std. Dev.)
1.31 to 2.3 (0.50 - 1.5 Std. Dev.)
> 2.3 (> 1.5 Std. Dev.)
Data source:
Cook County Assessor, US Census, CMAP
Scale
0 1 2
Miles

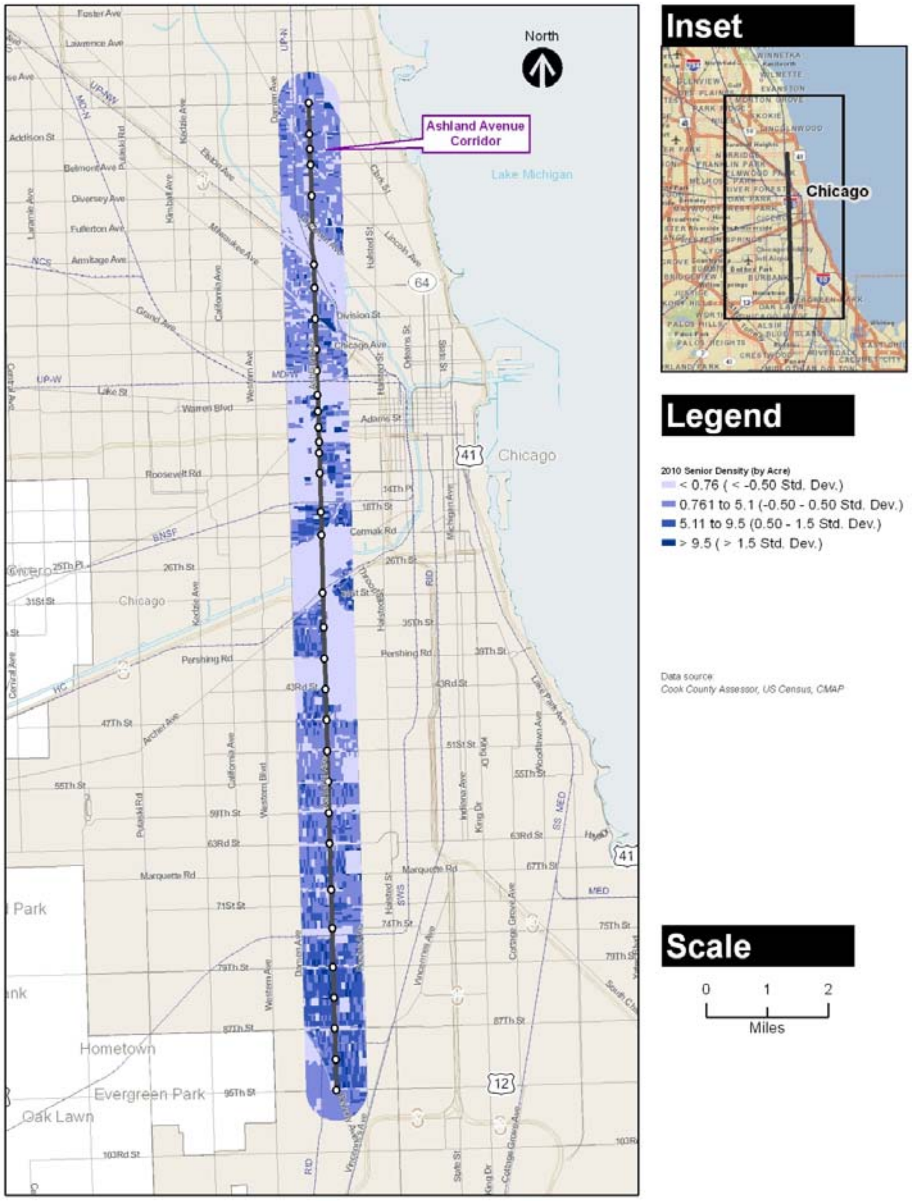
Description: Number of families under 100% of ratio of income to poverty divided by acres.
Source: 2010 American Community Survey (5-year estimates)
Data Table: B17026 (ratio of income to poverty level of families in the past 12 months)
Geography: Census Tract
Universe: Families
Data Source Reference: 2010 American Community Survey 5-year estimates, Data Table B17026 (Ratio of income to poverty level of families in the past 12 months).

Figure 7: 2010 Youth (Half Mile Buffer)



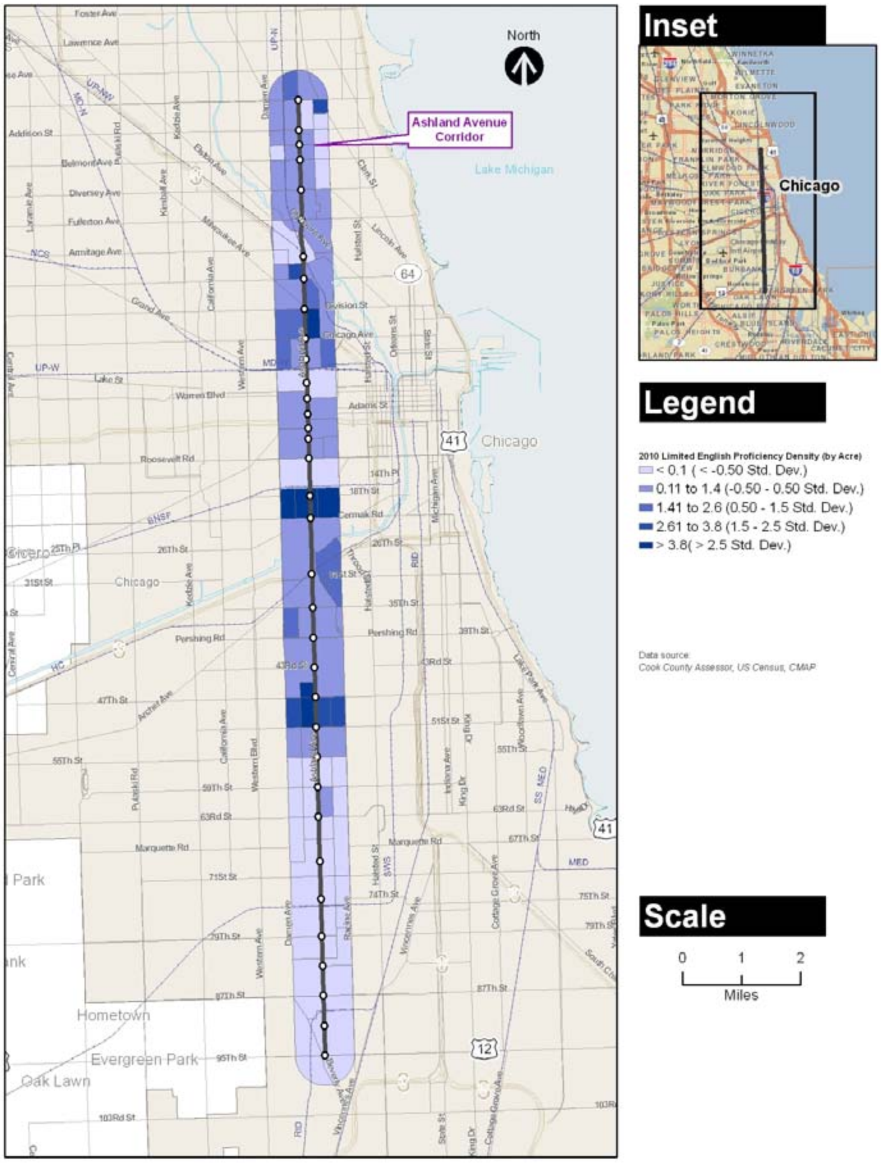
Description: Total youth population aged 10 to 17 years divided by acres.
Source: 2010 Decennial Census (100% data)
Data Table: P12 (Sex by age)
Geography: Census Block
Universe: Total Population
Data source reference: 2010 Decennial Census Data Table P12 (Sex by age).

Figure 8: 2010 Seniors (Half Mile Buffer)


North
Ashland Avenue Corridor
Lake Michigan
Chicago
Inset
Chicago
Legend
2010 Senior Density (by Acre)
▢ < 0.76 (< -0.50 Std. Dev.)
▨ 0.761 to 5.1 (-0.50 - 0.50 Std. Dev.)
■ 5.11 to 9.5 (0.50 - 1.5 Std. Dev.)
■ > 9.5 (> 1.5 Std. Dev.)
Data source
Cook County Assessor, US Census, CMAP
Scale
0
1
2
Miles

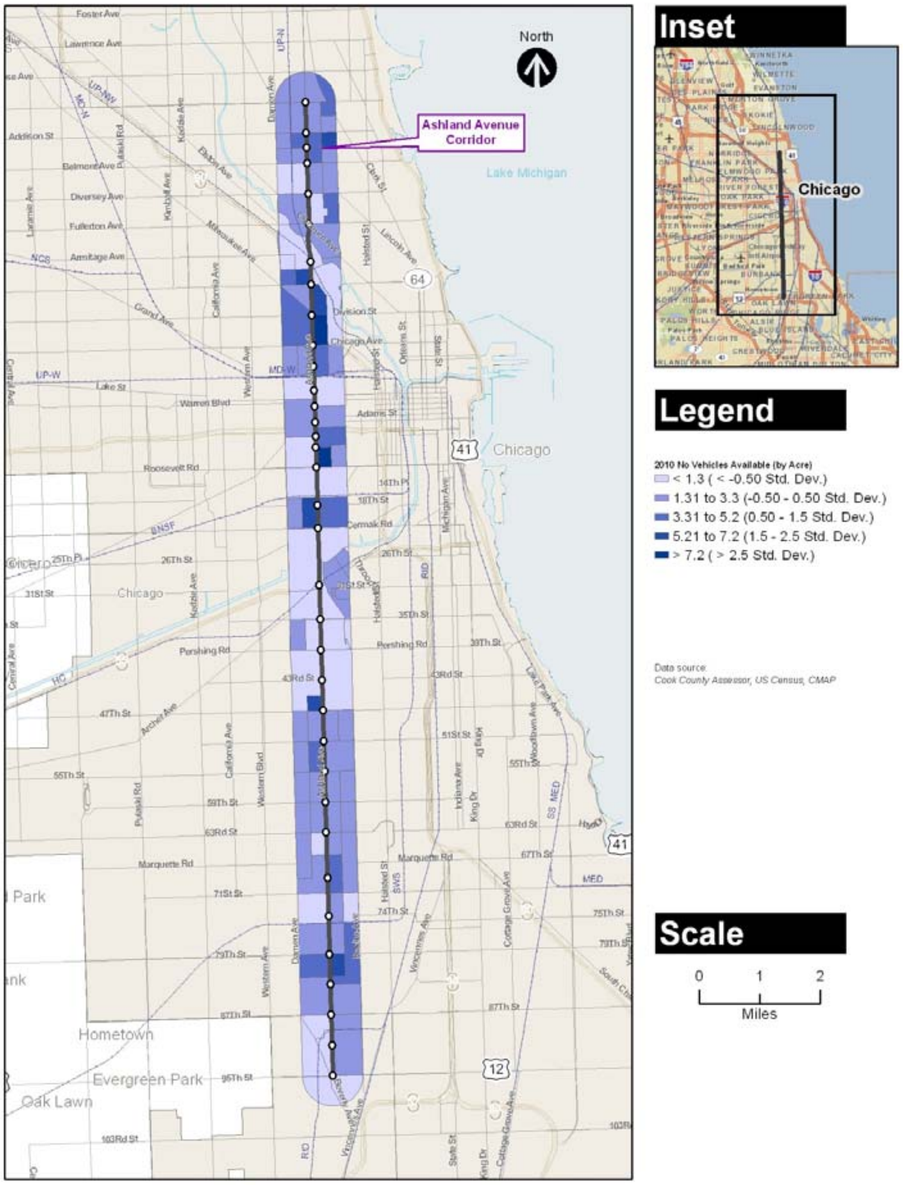
Description: Total senior population aged 60 and older divided by acres.
Source: 2010 Decennial Census (100% data)
Data Table: P12 (Sex by age)
Geography: Census Block
Universe: Total Population
Data source reference: 2010 Decennial Census Data Table P12 (Sex by age).

Figure 9: 2010 Limited English Proficiency (Half Mile Buffer)


North
Ashland Avenue Corridor
Lake Michigan
Chicago
Inset
Chicago
Legend
2010 Limited English Proficiency Density (by Acre)
< 0.1 (< -0.50 Std. Dev.)
0.11 to 1.4 (-0.50 - 0.50 Std. Dev.)
1.41 to 2.6 (0.50 - 1.5 Std. Dev.)
2.61 to 3.8 (1.5 - 2.5 Std. Dev.)
> 3.8(> 2.5 Std. Dev.)
Data source:
Cook County Assessor, US Census, CMAP
Scale
0
1
2
Miles

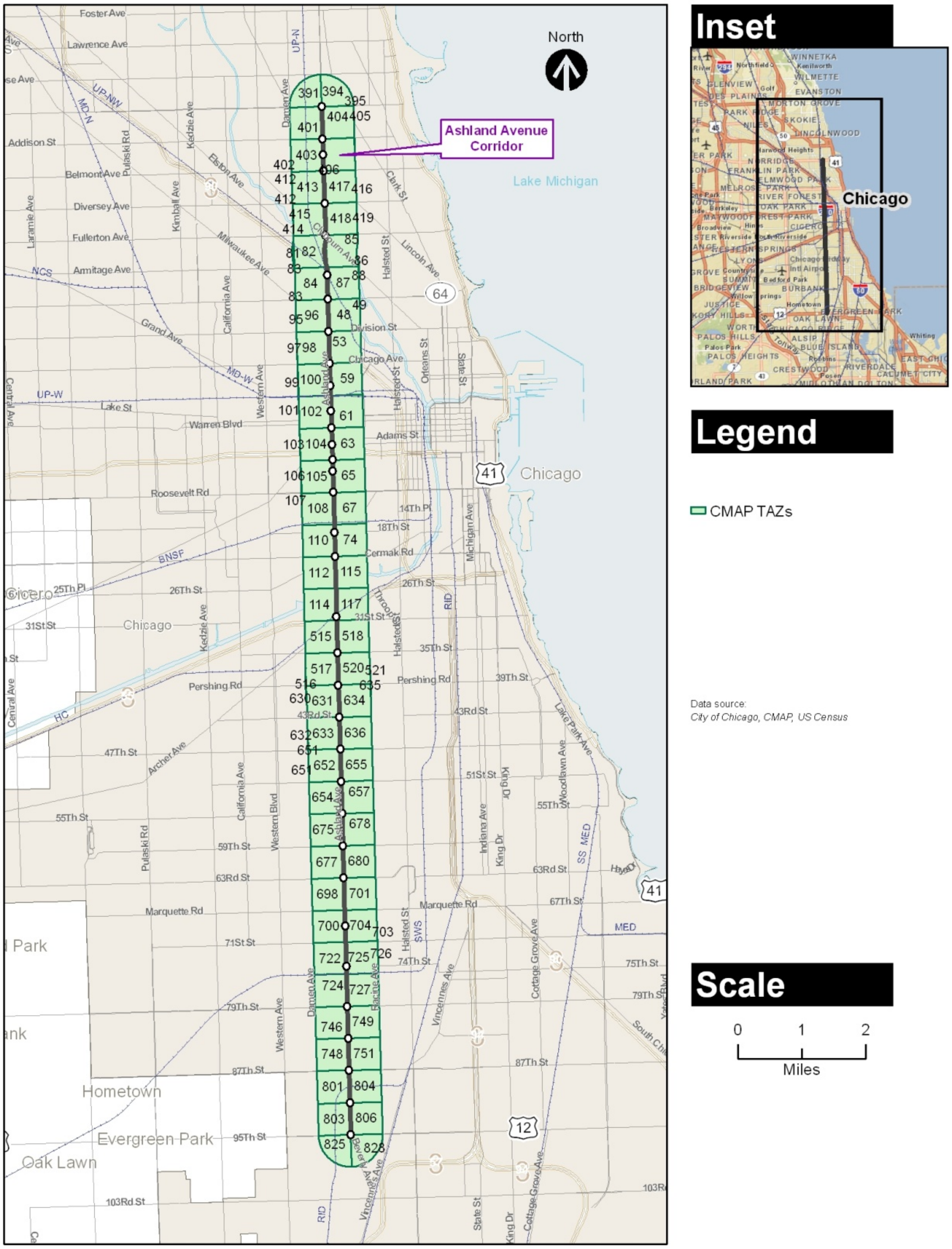
Description: Number of households in which no one in the house over the age of 14 is able to speak English proficiently divided by acres.
Source: 2010 American Community Survey (5-year estimates)
Data Table: B16001 (Household language by households in which no one 14 and over speaks English only or speaks a language other than English at home and speaks English "very well")
Geography: Census Tract
Universe: Households
Data Source Reference: 2010 American Community Survey 5-year estimates, Data Table B16001 (Household language by households in which no one 14 and over speaks English only or speaks a language other than English at home and speaks English "very well").

Figure 10: 2010 No Vehicle Available (Half Mile Buffer)


North
Ashland Avenue Corridor
Lake Michigan
Chicago
Inset
Chicago
Legend
2010 No Vehicles Available (by Acre)
< 1.3 (< -0.50 Std. Dev.)
1.31 to 3.3 (-0.50 - 0.50 Std. Dev.)
3.31 to 5.2 (0.50 - 1.5 Std. Dev.)
5.21 to 7.2 (1.5 - 2.5 Std. Dev.)
> 7.2 (> 2.5 Std. Dev.)
Data source:
Cook County Assessor, US Census, CMAP
Scale
0
1
2
Miles

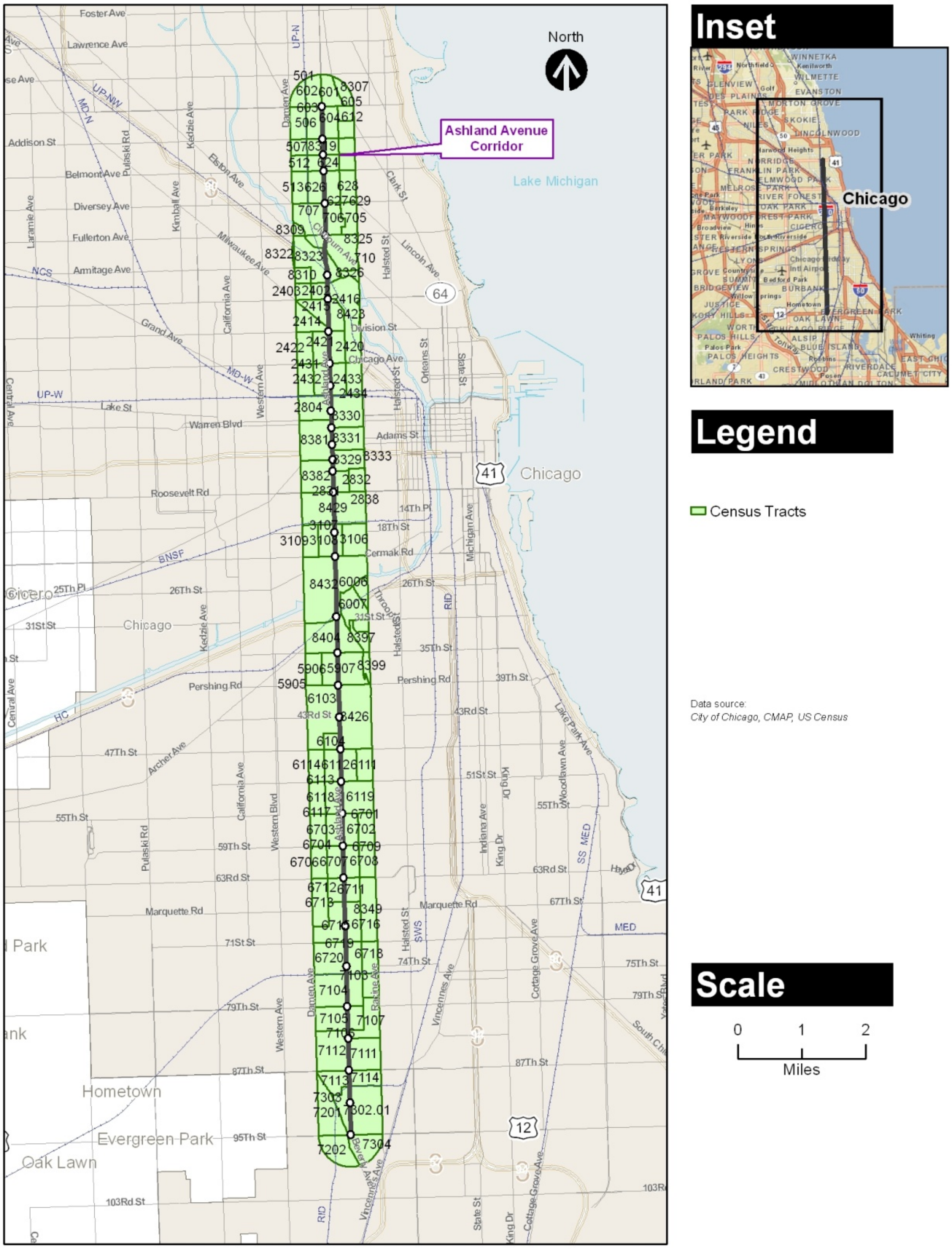
Description: Number of Households with zero or one vehicles available divided by acres.
Source: 2010 American Community Survey (5-year estimates)
Data Table: B08201 (Household size by vehicles available)
Geography: Census Tract
Universe: Households
Data Source Reference: 2010 American Community Survey 5-year estimates, Data Table B08201 (Household size by vehicles available).

Figure 11: CMAP TAZs (Half Mile Buffer)



Data source:
City of Chicago, CMAP, US Census

Figure 12: Census Tracts (Half Mile Buffer)



Data source:
City of Chicago, CMAP, US Census

Neighborhoods and Aldermanic Wards

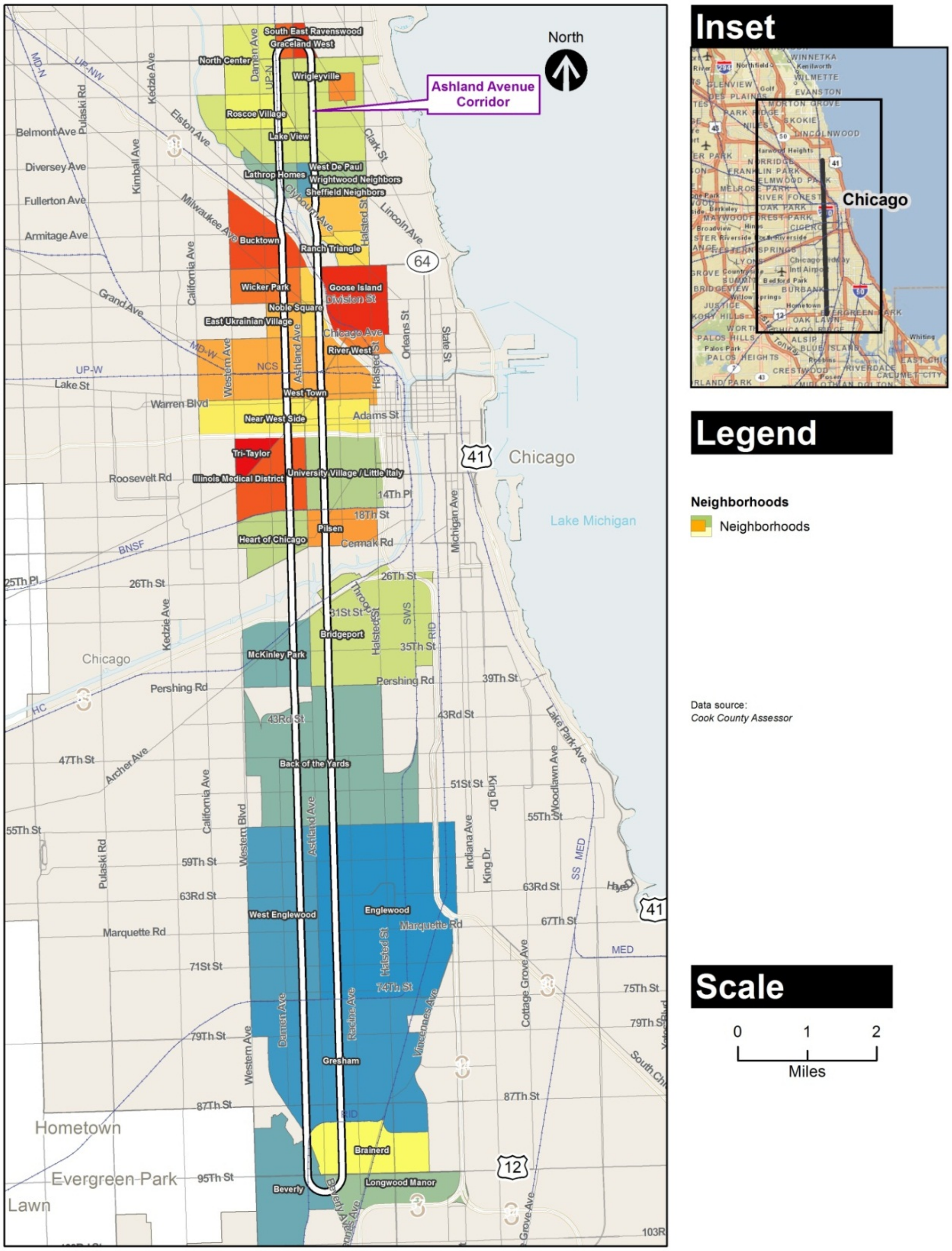
The Ashland Avenue corridor intersects 33 of Chicago's 228 designated neighborhoods, as shown in **Figure 13**. Neighborhoods intersecting the corridor including the following:

- Beverly
- Longwood Manor
- McKinley Park
- West De Paul
- Near West Side
- Noble Square
- Tri-Taylor
- Wrigleyville
- Goose Island
- Graceland West
- Brainerd
- Ranch Triangle
- Bucktown
- Illinois Medical District
- West Englewood
- Gresham
- South East Ravenswood
- Lake View
- Bridgeport
- River West
- Heart of Chicago
- Pilsen
- Lathrop Homes
- University Village / Little Italy
- East Ukrainian Village
- North Center
- Roscoe Village
- Englewood
- Back of the Yards
- West Town
- Wicker Park
- Wrightwood Neighbors
- Sheffield Neighbors

The corridor also intersects 20 of Chicago's 50 Aldermanic Wards, including the following:

- Ward 1 - Joe Moreno
- Ward 2 - Robert Fioretti
- Ward 3 - Pat Dowell
- Ward 11 - James A. Balcer
- Ward 12 - George A. Cardenas
- Ward 15 - Toni Foulkes
- Ward 16 - Joann Thompson
- Ward 17 - Latasha R. Thomas
- Ward 18 - Lona Lane
- Ward 19 - Matthew Oshea
- Ward 20 - Willie Cochran
- Ward 21 - Howard B. Brookins, Jr.
- Ward 25 - Daniel S. Solis
- Ward 26 - Roberto Maldonado
- Ward 27 - Walter Burnett, Jr.
- Ward 32 - Scott Waguespack
- Ward 43 - Michelle Smith
- Ward 44 - Thomas M. Tunney
- Ward 46 - James Cappleman
- Ward 47 - Ameya Pawar

Figure 13: Intersecting Neighborhoods (HalfMile Buffer)



Data source:
Cook County Assessor

Community Facilities

There are also several community facilities located along Ashland Avenue. Schools and hospitals that are located immediately adjacent to the BRT route along Ashland Avenue are listed in **Table 2** and are shown in **Figure 14**. In three cases, these community facilities are located next to a station. In these circumstances, community facilities may be considered when laying out detailed station design.

Table 2: Hospital and School Locations

Type	Name	Location	Nearest Station Name	Adjacent to Station*
Hospitals	Rush University Medical Center	1653 W. Congress	Harrison	Yes
Schools	Lake View High School	4015 N. Ashland Avenue	Irving Park	Yes
	Cooper Elementary	1624 W. 19th Street	18th	No
	Wells High School	936 N. Ashland Avenue	Chicago	No
	Burr Elementary	1621 W. Wabansia Avenue	North	Yes
	Montefiore Alt Elementary	1310 S. Ashland Avenue	Roosevelt	No
	Providence Englewood Charter	6515 S. Ashland Avenue	63rd	No
	Hope ES	1628 W. Washington Boulevard	Lake	No

* Defined as within 250 feet of a station intersection

Police and fire stations located near the corridor are shown in **Table 3** and Police Stations are shown in **Figure 12**. The 7th Precinct Police Station is located within a quarter mile of the corridor at 1400 W 63rd Street. There are also seven fire stations located within a quarter mile of the corridor, five of which are located on Ashland Avenue. The Stations at 5955 Ashland Avenue and 1125 Ashland Avenue are immediately adjacent to proposed BRT station intersections.

Table 3: Police and Fire Stations

Type	Name	Location	Nearest BRT Station	Adjacent to Station
Police Station	7th Precinct	1400 W 63rd Street	63rd	No
Fire Stations	E103	25 S Laflin Street	Madison	No
	E116	5955 S Ashland Avenue	59th	Yes
	E121	1724 W 95th Street	95th	No
	E129	8120 S Ashland Avenue	83rd	No
	E30	1125 N Ashland Avenue	Division	Yes
	E39	1618 W 33rd Place (at Ashland Avenue)	35th	No
	E49	4401 S Ashland Avenue	43rd	No

* Defined as within 250 feet of a station intersection

Environmental Impacts

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed and no impacts to neighborhoods or communities would occur.

Ashland Avenue BRT Project

The proposed improvements would not divide any neighborhoods or otherwise adversely affect community cohesion. BRT facilities would be designed and sited to complement the existing character of the project area neighborhoods. This would include station signage to important points of interest at specific BRT station locations and decorative artwork consistent with community character, and inclusion of these features would be determined during final design with input from community stakeholders and neighborhood elected officials (aldermen). In addition, CTA and CDOT have both established design guidelines that would be incorporated into final design. CDOT's *Complete Streets Chicago Design Guidelines*[1] and CTA's *Transit Friendly Design Guide*[2] would be used to ensure that the design of stations and crossing fit the form and function of adjacent land uses and roadway typologies within the corridor. Mid-block crossings would be provided at specific locations along the corridor to ensure safe pedestrian crossings between signalized intersections. Changes to the physical layout of the existing right-of-way would improve the quality of pedestrian access to the public realm – including public streets, right-of-way, civic buildings, parks and open space - and therefore has the potential to enhance community cohesion. Improvements at intersections would also help reduce the dividing effect between neighborhoods that Ashland Avenue currently has in some areas. Designs would be sensitive to emergency access needs in the corridor, and continued coordination through final design would help to ensure no impediments to emergency access points.

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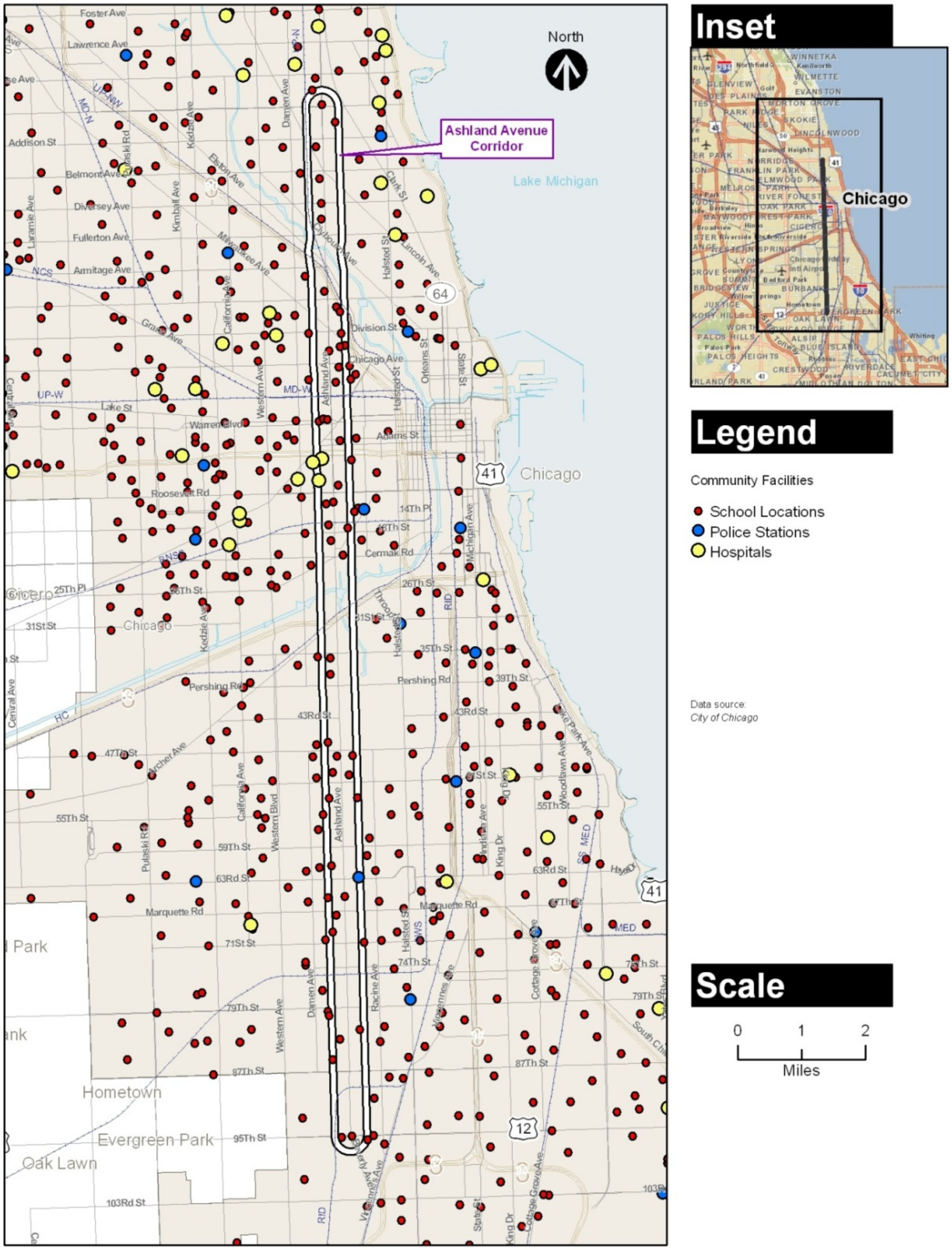
[1] Chicago Department of Transportation, Complete Streets Chicago Design Guidelines, 2013.
http:□www.cityofchicago.org□content□dam□city□depts□cdot□Complete□ 20Streets□CompleteStreetsGuidelines.pdf

[2] Chicago Transit Authority, Transit-Friendly Development Guide: Station Area Typology, 2009.
http:□www.cityofchicago.org□dam□city□depts□zlup□Planning□and□Policy□Publications□Transit□Friendly□Development□Guide□CTA□Typology□Study.pdf

Figure 14: Community Facilities



Data source:
City of Chicago

Appendix E-3: Cultural Resources Technical Memorandum

Ashland Avenue
Bus Rapid Transit Project

Memorandum

Date: *November 5, 2013*

Subject: *Cultural Resources*

Prepared By: *CDM Smith, Inc.*

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and FTA, is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue BRT Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

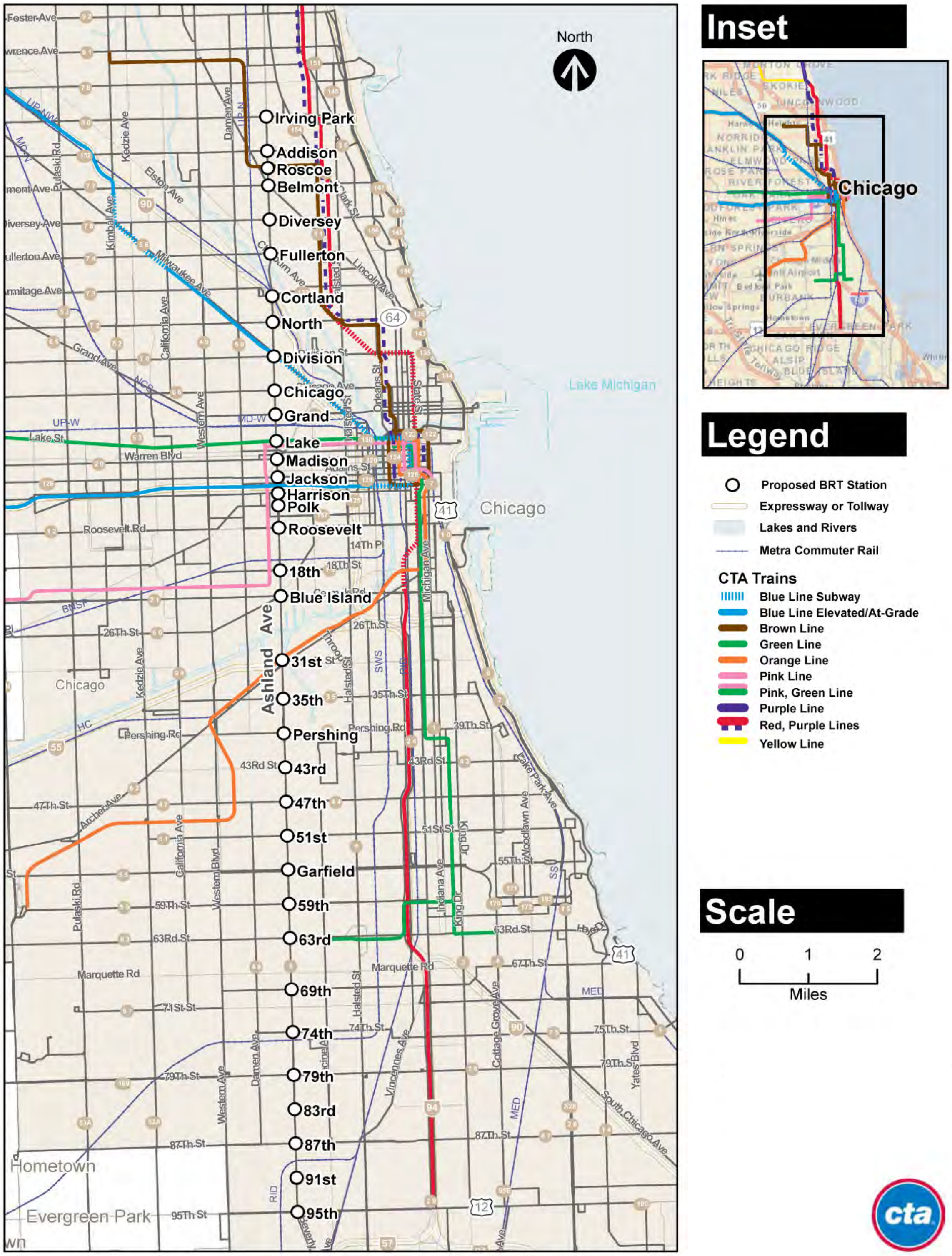
- Construction of median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

There are 35 proposed BRT station locations, which are shown in **Figure 1.**

Purpose

The purpose of this memorandum is to evaluate the impact of the proposed project on cultural resources and for documenting compliance with Section 106 of the National Historic Preservation Act.

Figure 1: Proposed BRT Station Location Map



The following sections include a description of the Area of Potential Effect (APE), an overview of archival research activities, a description of the level of identification efforts conducted, and a summary of the documentation effort. **Attachment A** contains a primer which explains in more detail the concepts associated with the analysis and accompanying Section 106 consultation process.

Identification Methodology

Cultural resource specialists, in consultation with FTA and IHPA, developed an APE for cultural/historic resources along the Ashland Avenue BRT Project corridor. The APE takes into account the location of proposed BRT stations as well as the potential for other effects (e.g. visual changes) that could impact historic resources.

The APE is confined to the right-of-way in the areas between the station locations because the project activities between stations (including milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements) would not result in any potential adverse proximity effects to the location, design, setting, materials, workmanship, feeling, or association of nearby historic resources. Because the project area is located within a heavily urbanized area, the boundaries for the APE at the proposed station locations were based on the area directly impacted by construction plus a buffer to account for potential visual changes. The exact size of the buffer varies for each station based on the location, setting and building sizes in the area.

To identify historic architectural resources in the APE, the Historic Architectural Resources Geographic Information System (HARGIS), the National Register of Historic Places (NRHP) database, and city records--including the Chicago Landmarks List and the Chicago Historic Resources Survey (CHRS)--were reviewed. Using this information, a list of NRHP listed and previously determined eligible properties within the APE was compiled. This effort included the identification of known archaeological sites, NRHP listed districts and structures, CHRS properties rated Orange or Red, locally listed historic landmarks, and any additional properties previously identified as eligible for the NRHP. CHRS Red properties denote resources that possess some architectural features or historical association that make them potentially significant at the city, state, or national level; CHRS Orange properties denote resources that possess some architectural features or historical association that make them potentially significant at the community level. **Attachment B** contains a complete listing of all properties rated as “red” or “orange” on the CHRS that fall within the APE.

Consistent with the regulations (36 CFR 800.4.b.1), the team has considered past planning, research and studies; the magnitude and nature of the undertaking; the nature and extent of potential effects on historic properties; and the likely nature and location of historic properties within the APE in its identification efforts. As with the development of the APE, the survey and documentation methodology was developed in consultation with FTA and IHPA.

The archival research identified five NHRP historic districts, four local landmarks, and 34 CHRS Red or Orange properties within the APE. Following archival research, the team’s architectural historian completed a windshield survey in March 2013 of the Ashland Avenue BRT Project APE, noting buildings within the APE that exhibit distinguishing architectural features associated with historic styles. During the March 2013 field visit, the historian examined structures surrounding each of the 35 station areas and noted individual structures within the APE (including the Red, Orange coded properties, local landmarks, etc.) that exhibited a level of historic architectural significance that could make them candidates for historic evaluation. Each of these were photographed and assessed within the context of their community to determine their eligibility for NRHP listing. Following this assessment, 25 individual properties within the APE have been NRHP listed previously or are recommended as NRHP eligible. **Table 1** depicts NRHP listed resources, additional resources recommended as NRHP eligible, CHRS Orange/Red properties, and local landmarks within the APE. The primer in **Attachment A** provides information on eligibility criteria.

NRHP Listed Districts

Portions of five NRHP listed or determined eligible historic districts fall within or adjacent to the APE:

- East Ravenswood Historic District, a collection of over 1,500 residential, commercial, and industrial buildings roughly bounded by Lawrence Avenue, Clark Street, Irving Park Road, and Ravenswood Avenue. The district is locally significant under Criterion A for its association with community planning and development and under Criterion C for its architecture.
- West Jackson Boulevard Historic District, which is bounded by Laflin, Ashland, Adams and Van Buren streets includes 40 contributing structures on approximately 8.5 acres. The district is listed under Criterion C for its architecture, with a period of significance of 1876-1890.
- Pilsen Historic District, roughly bounded by 16th Street, Cermak Road, Halsted Street, and Western Avenue, which contains over 4,400 contributing structures. The district is listed under Criterion A for its association with ethnic heritage (Bohemian-American and Mexican-American cultures), industry, and social history. It is also listed under Criterion C for its architecture.
- Chicago Sanitary and Ship Canal Historic District, within Chicago city limits, is bounded by the footprint of the waterway and extends from just east of Ashland Avenue (near 29th Street) to just west of Cicero Avenue (near 41st Street). The entire Chicago Sanitary and Ship Canal is 28 miles long and forms a shipping link between Lake Michigan and the Mississippi River system. The district is listed under Criterion A for its association with maritime history, commerce, transportation, community planning, and development and under Criterion C for its architecture, with a period of significance of 1875-1974.
- Chicago Park Boulevard System Historic District, is approximately 26 miles in length and contains a continuous system of parks and boulevards from the southeast part of Chicago at Dr. Martin Luther King, Jr. Drive, west, north and back east, to the eastern end of Logan

Boulevard. It contains eight parks, 19 boulevards and six squares. The historic district intersects with the APE for the project where Ashland Avenue intersects with Garfield Boulevard, nearest to Sherman Park. The district was determined eligible under Criterion A for its association with community planning and development, and under Criterion C for its architecture and landscape architecture with a period of significance of 1869–1964.

Table 1: NRHP Eligibility Recommendations for Buildings and Structures within the APE

Property Description	Date	CHRS	Landmark	NRHP
Gothic Revival School, 4015 North Ashland Avenue	1893	Orange	No	Recommended Eligible, Contributing element within the East Ravenswood Historic District
Classical Revival Mixed Use Building, 3175 North Lincoln Avenue	1890s	No	No	Recommended Eligible
Classical Revival Mixed Use Building, 1545 West Division Street	1920s	No	No	Recommended Eligible
Classical Revival Mixed Use Bldg, 1200 North Ashland Avenue	1920s	Orange	Yes	Listed
Vernacular Commercial Building, 238 North Ashland Avenue	1910s	Orange	No	Recommended Eligible
Queen Anne Train Station , Lake Street at Ashland Avenue	1890s	Orange	No	Recommended Eligible
Art Deco/Moderne Gymnasium, 1545 West Lake Street	1900s	Orange	No	Recommended Eligible
Art Deco/Moderne Hotel, 1521 West Warren Boulevard	1920s	Orange	Yes	Listed
Italianate Mixed Use Building, 236-238 South Ashland Avenue	1889	Orange	No	Recommended Eligible
Romanesque Revival Residential Bldg, 1539 West Jackson Boulevard	1889	Orange	Yes	Recommended Eligible, Contributing element within the West Jackson Boulevard Historic District
Romanesque Revival Residential Bldg, 315 South Ashland Avenue	1890s	Orange	No	Recommended Eligible, Contributing element within the West Jackson Boulevard Historic District
Classical Revival Church, 733 South Ashland Avenue	1910s	Orange	No	Recommended Eligible
Gothic Revival Church, 1132 South Ashland Avenue	1880s	Orange	No	Recommended Eligible

Property Description	Date	CHRS	Landmark	NRHP
Renaissance Revival Mixed Use Bldg, 1812 South Ashland Avenue	1890s	Orange	No	Recommended Eligible, Contributing element within the Pilsen Historic District
Industrial Building, 3538 South Ashland Avenue	1910s	Orange	No	Recommended Eligible
Classical Revival Commercial Bldg, 4700 South Ashland Avenue	1910s	Orange	Yes	NRHP Listed
Classical Revival Mixed Use Building, 5043 South Ashland Avenue	1893	Orange	No	Recommended Eligible
Classical Revival School, 1614 West 51st Street	1924	No	No	Recommended Eligible
Gothic Revival Church, 1624 West 51st Street	1900s	Orange	No	Recommended Eligible
North Ashland Avenue Bridge, Ashland Avenue crossing of the North Branch Chicago River	1936	No	No	Determined Eligible
Classical Revival Commercial Building, 1534 West 63rd Street	1900s	Orange	No	Recommended Eligible
Classical Revival Mixed Use Building, 7845 South Ashland Avenue	1920s	Orange	No	Recommended Eligible
Art Deco/ Moderne Mixed Use Bldg, 7912 South Ashland Avenue	1930s	No	No	Recommended Eligible
Art Deco/ Moderne Mixed Use Bldg, 7922 South Ashland Avenue	1931	No	No	Recommended Eligible
Classical Revival Mixed Use Building, 9459 South Ashland Avenue	1880s	No	No	Recommended Eligible

Overview of Known Archaeological Sites

Two previously recorded archaeological sites were identified along the Ashland Avenue corridor.

- Site 11-Ck-350 is a historic site that contains the remaining endpoint of the Illinois and Michigan Canal.
- Site 11-Ck-781 is the Central Manufacturing District. It is part of the first American industrial park, established in 1905.

No archaeological field investigations are expected due to the limited nature of the project and the location within the existing-right-of-way. This project does not include any monitoring or invasive investigations.

Assessment of Effects

Effects for each NRHP listed or eligible resource within the APE were assessed. The assessment of adverse effects has been conducted according to the criteria of adverse effect (36 CFR 800.5). Per regulations from the Advisory Council on Historic Preservation (See **Attachment A**), an Adverse Effect is an "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places" such that a resource's location, design, setting, materials, workmanship, feeling, or association is diminished.

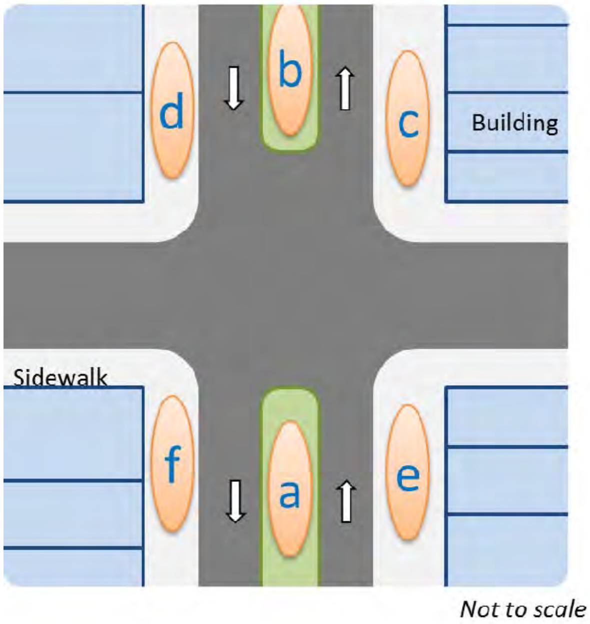
A No Adverse Effect determination is found when the undertaking's effects do not meet the criteria of the preceding paragraph on adverse effects or the undertaking is modified or conditions are imposed to avoid adverse effects. No Effect is found when there are no historic properties present or there are historic properties present but the undertaking will have no impact on them.

Although median stations are the preferred option and would be constructed at most stations, curbside stations may be provided at a few locations, due to roadway geometrics and/or access considerations to adjacent land uses. Because the exact placement for each station is not known at this time, the effects for six potential configurations at each of the 35 station locations are considered:

- Median station south of the cross street
- Median station north of the cross street
- Curbside station in the northeast quadrant of the intersection
- Curbside station in the northwest quadrant of the intersection
- Curbside station in the southeast quadrant of the intersection
- Curbside station in the southwest quadrant of the intersection

Figure 2 shows the six potential configurations graphically.

Figure 2: Potential Station Locations



Attachment C presents information about each station area that contains NRHP listed or eligible resources. Of the 35 proposed station locations along the corridor, 17 contain historic resources and are included in this report. For each recommended eligible and listed resource, tables in **Attachment C** describe the six possible station configurations and whether or not they result in any adverse effects on nearby historic properties. Figures depicting the APE and identified resources are also provided for each of the 17 stations. Analysis assumes all stations are located along Ashland Avenue, within existing right-of-way and in the immediate vicinity of the identified cross street.

Figures 3 and **4** show conceptual renderings for both a median and curbside station, respectively; these designs formed the basis of the effects analysis. For the median stations that fall outside of historic districts, given their location within the center of the roadway, they are far enough from the resources to not have an adverse effect in either the north or south locations. Median stations that do fall within historic districts would be designed in a context sensitive way as not to create an adverse effect upon the district. For curbside stations that fall within the same quadrant of a historic resource, since the design is similar to existing shelter designs, they would not have an adverse effect upon the resources.

No historic structures would be demolished or relocated for the project. Since a bus route currently exists along the corridor, there would not be new transportation elements introduced that would cause vibratory or noise impacts along the corridor. Based on the station designs, locations, and the characteristics that make each of the resources eligible, there would be no adverse impacts upon the eligible resources or districts. Because of these factors the determination of no adverse effects is recommended. If substantially different design parameters are used during final design, reassessment and/or additional coordination with the State Historic Preservation Office (SHPO) and other consulting parties may be required.

Figure 3: Typical Median Station Conceptual Design

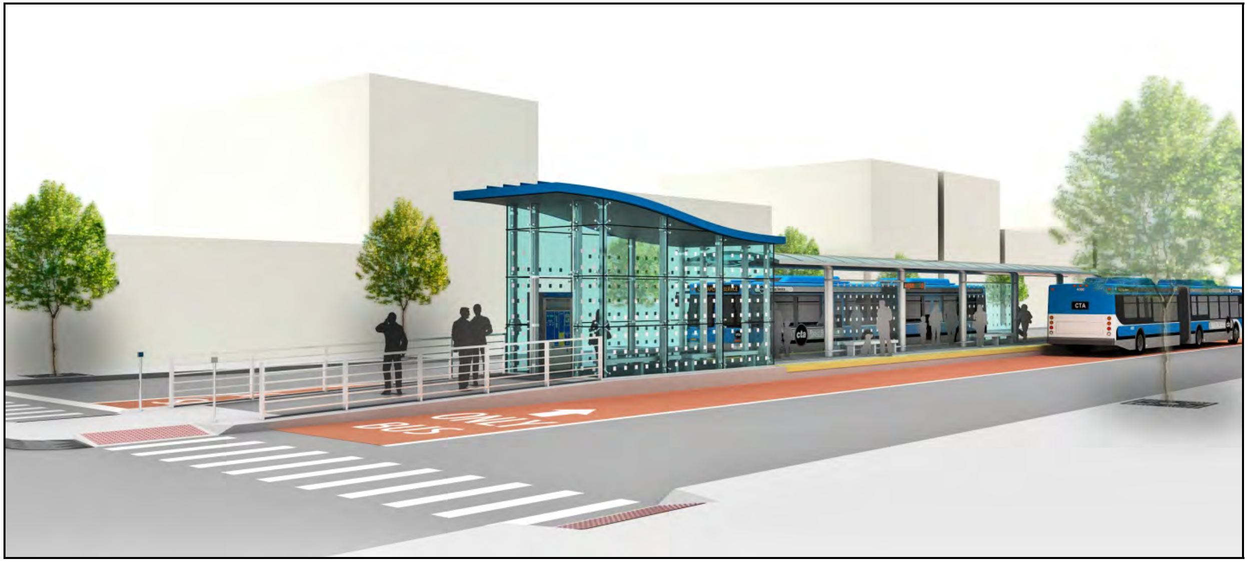
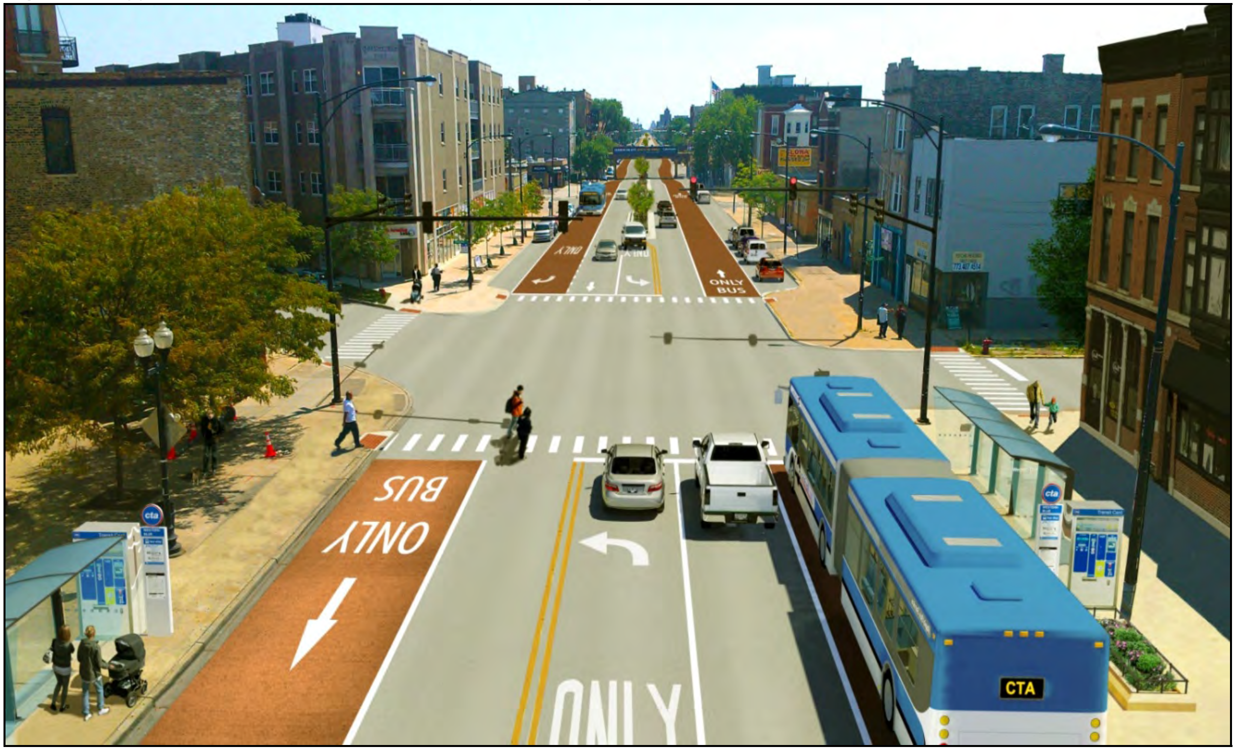


Figure 4: Typical Curbside Station Conceptual Design



Attachment A

Consultation Primer

Cultural and historic resources are protected by various federal regulations. Most notably, Section 106 of the National Historic Preservation Act requires federal agencies to consider impacts to historic resources from their actions, and to balance preservation needs with the need for the proposed project. The Section 106 process "seeks to accommodate historic preservation concerns with the need of federal undertakings through consultation … The goal of the consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties" (36 CFR 800.1(a)).

As part of the process, the project team will work through a three-step process with consulting parties to (1) identify historic properties that could be potentially affected by the project; (2) assess project effects on these resources; and (3) develop ways to avoid, minimize, or mitigate adverse effects on historic properties. A variety of organizations are eligible to participate in the consultation process, including the State Historic Preservation Office (SHPO), Tribal Historic Preservation Offices (THPO), local governments, and other organizations/individuals with a demonstrated interest in the project or the affected properties.

Definition of the APE

Prior to historic resource identification efforts, the project team developed the Area of Potential Effects (APE) in consultation with the SHPO. The APE defines the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist. Its boundaries are defined to encompass geographic areas where project effects may occur, independent of the presence of historic properties or districts.

Eligibility Determinations for Aboveground Historic Resources

Cultural historians then conducted research and field visits to identify properties which are listed in or eligible for listing in the National Register of Historic Places (NRHP). The NRHP is the nation's official list of properties recognized for their significance in American history, architecture, archaeology, engineering, and culture. It is maintained by the National Park Service and includes districts, sites, buildings, structures, and objects. To be eligible for listing in the NRHP, a property must meet at least one of four criteria:

A. Association with events that have made a significant contribution to broad patterns in history
B. Association with persons significant to the past
C. Embodiment of distinctive architectural design or construction characteristics
D. Potential to yield information important to history or prehistory (e.g. archaeological sites)

In addition, a property must also maintain a degree of integrity; that is, it must retain adequate integrity to convey the characteristics that make it significant. **Table 1** summarizes the seven aspects of integrity, defined in 36 CFR 60, which identifies procedures to evaluate properties for listing on the NRHP.

Table 1: Aspects of Integrity

Integrity	Definition
Location	Location is the place where the historic property was constructed or the place where the historic event occurred.
Design	Design is the combination of elements that create form, plan, space, structure and style of a property.
Setting	Setting is the physical environment of a historic property.
Materials	Materials are the physical elements that were combined or deposited during a particular period of a time and in a particular pattern or configuration to form a historic property.
Workmanship	Workmanship is the physical evidence of the crafts of a particular culture or people during any give period in history or prehistory.
Association	Association is the direct link between an important historic event or person and a historic property.
Feeling	Feeling is a property’s expression of the aesthetic or historic sense of a particular period of time.

Determination of Effects

Once NRHP listed and eligible resources were identified, the project team relied on technical analyses to identify project impacts such as displacements, changes in noise levels, or alterations to the visual environment. Impacts resulting from each alternative were examined to determine whether they would result in an adverse effect on aboveground historic resources.

Per the Advisory Council on Historic Preservation, an adverse effect is an “alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places” such that the property’s location, design, setting, materials, workmanship, feeling, or association is diminished (36 CFR 800.5). This can include direct effects (caused by the action and occurring at the same time and place), indirect effects (reasonably foreseeable effects caused by the action but occurring later in time or farther removed), or cumulative effects (changes considered alongside effects from other projects).

A “No Adverse Effect” determination is found when the project’s effects do not meet the criteria of the preceding paragraph, the undertaking is modified, or conditions are imposed to avoid adverse effects. A “No Effect” determination is found when the project will have no impact on a particular historic resource. A “No Historic Properties Affected” determination is found for the overall project when either there are no historic properties present or there are historic properties present but the project will have no impact on any of them.

Mitigating Adverse Effects

Once the project team has determined which historic resources (if any) are adversely affected by the project, the team will work with consulting parties to identify measures to avoid, minimize, and mitigate these impacts. As needed, commitments will be formalized in a Memorandum of Agreement between the federal agency, local lead agency, SHPO, and other signatories.

Attachment B

Property	**Date**	**CHRS**	**Nearest Proposed Station Location**
Colonial Revival Mixed Use Building 9109 South Ashland Avenue	1920s	Orange	91st Street
Art Deco/ Moderne Mixed Use Bldg. 7909 South Ashland Avenue	1930s	Orange	79th Street
Classical Revival Mixed Use Building 7845 South Ashland Avenue	1920s	Orange	79th Street
Classical Revival Commercial Building 1534 West 63rd Street	1900s	Orange	63rd Street
Gothic Revival Church 1624 West 51st Street	1900s	Orange	51st Street
Classical Revival Mixed Use Building 5043 South Ashland Avenue	1893	Orange	51st Street
Classical Revival Commercial Bldg. 4700 South Ashland Avenue	1910s	Orange	47th Street
Industrial Building 3538 South Ashland Avenue	1910s	Orange	35th Street
Italianate Mixed Use Building 1724 South Ashland Avenue	1880s	Orange	18th Street
Colonial Revival Mixed Use Building 1718 South Ashland Avenue	1900s	Orange	18th Street
Queen Anne Residential Building 1815 South Ashland Avenue	1880s	Orange	18th Street
Romanesque Revival Mixed Use Bldg. 1820 South Ashland Avenue	1890s	Orange	18th Street
Renaissance Revival Mixed Use Bldg. 1812 South Ashland Avenue	1890s	Orange	18th Street
Italianate Mixed Use Building 1804 South Ashland Avenue	1880s	Orange	18th Street
Gothic Revival Church 1132 South Ashland Avenue	1880s	Orange	Roosevelt
Classical Revival Church 733 South Ashland Avenue	1910s	Orange	Polk
Romanesque Revival Residential Bldg. 315 South Ashland Avenue	1890s	Orange	Jackson
Romanesque Revival Residential Bldg. 1539 West Jackson Boulevard	1889	Orange	Jackson
Italianate Mixed Use Building 234 - 238 South Ashland Avenue	1889	Orange	Jackson
Classical Revival Mixed Use Building 36 South Ashland Avenue	1890s	Orange	Madison
Art Deco/Moderne Hotel 1521 West Warren Boulevard	1920s	Orange	Madison
Art Deco/Moderne Gymnasium 1545 West Lake Street	1900s	Orange	Lake

Property	Date	CHRS	Nearest Proposed Station Location
Queen Anne Train Station Lake Street at Ashland Avenue	1890s	Orange	Lake
Vernacular Commercial Building 238 North Ashland Avenue	1910s	Orange	Lake
Queen Anne Mixed Use Building 1553 West Chicago Avenue	1880s	Orange	Chicago
Art Deco/ Moderne Mixed Use Bldg. 1200 North Ashland Avenue	1920s	Orange	Division
Italianate Mixed Use Building 1184 North Milwaukee Avenue	1880s	Orange	Division
Classical Revival Mixed Use Building 1201 North Milwaukee Avenue	1920s	Orange	Division
Classical Revival Commercial Building 1214 North Ashland Avenue	1900s	Orange	Division
Art Deco/ Moderne Mixed Use Bldg. 1227 North Milwaukee Avenue	1930s	Orange	Division
Italianate Mixed Use Building 1548 West Fullerton Avenue	1890s	Orange	Fullerton
Art Deco/ Moderne Mixed Use Bldg. 3204 North Lincoln Avenue	1920s	Orange	Belmont
Art Deco/ Moderne Mixed Use Bldg. 3225 North Ashland Avenue	1930s	Orange	Belmont
Gothic Revival School 4015 North Ashland Avenue	1893	Orange	Irving Park

Attachment C

Station Area 1: Irving Park

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, multi-family residences, a school, and modern buildings including a fast food restaurant. The East Ravenswood Historic District begins on the north side of the intersection. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 4015 North Ashland Avenue: Gothic Revival Lakeview High School	1893	Orange	No	Recommended Eligible; Contributing element with the East Ravenswood Historic District
2. East Ravenswood Historic District: a collection of over 1,500 residential, commercial, and industrial buildings roughly bounded by Lawrence Avenue, Clark Street, Irving Park Road, and Ravenswood Avenue	1880-1940	n/a	n/a	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 4015 North Ashland Avenue	- Median Station north or south of Irving Park Rd - SB Curbside Station north or south of Irving Park Rd - NB Curbside Station south of Irving Park Rd - NB Curbside Station north of Irving Park Rd*
2. East Ravenswood Historic District	- Median Station south of Irving Park Rd - SB Curbside Station south of Irving Park Rd - NB Curbside Station south of Irving Park Rd - Curbside or Median Station north of Irving Park Rd**

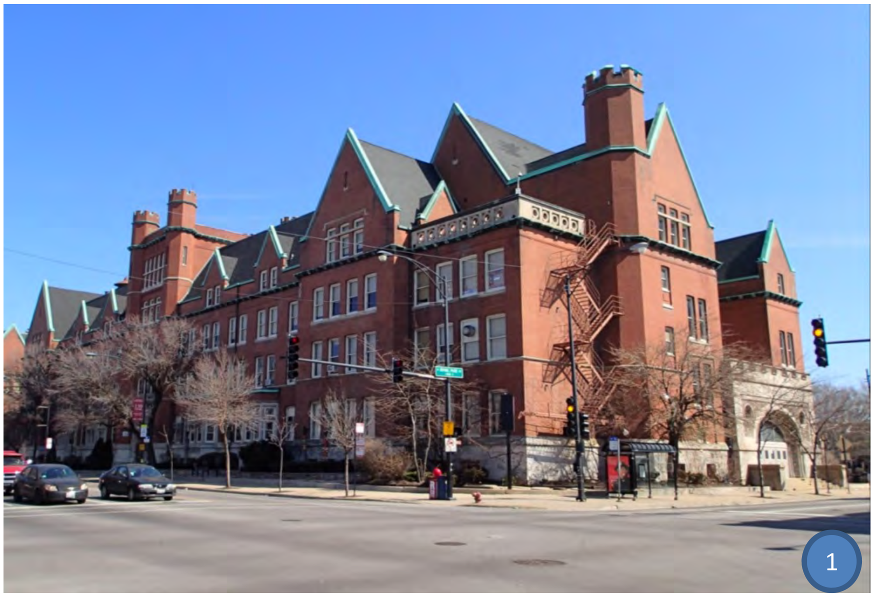
* Due to design of station being similar in size and scale to existing shelters along the corridor
** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor

Photos:

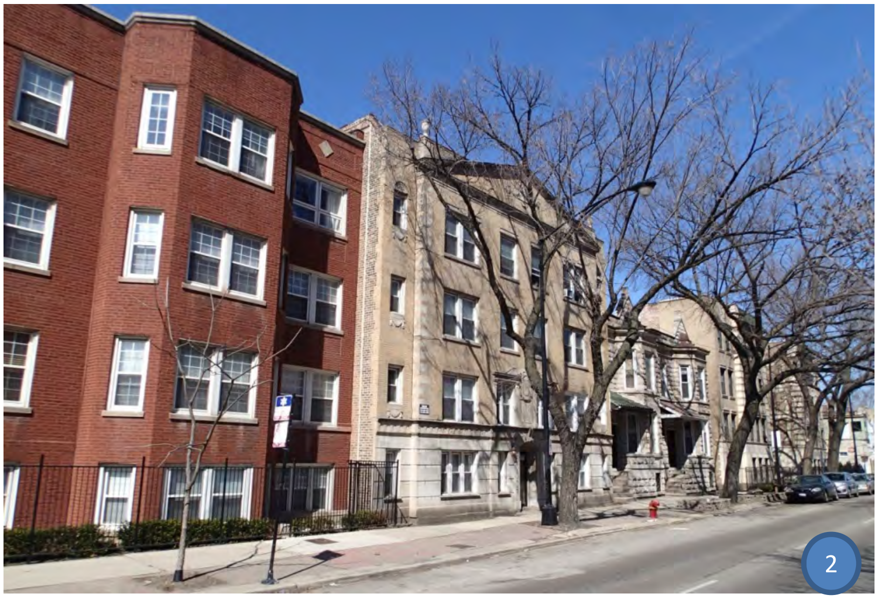
See Next Page

Station Area 1: Irving Park Cont'd

Photos:

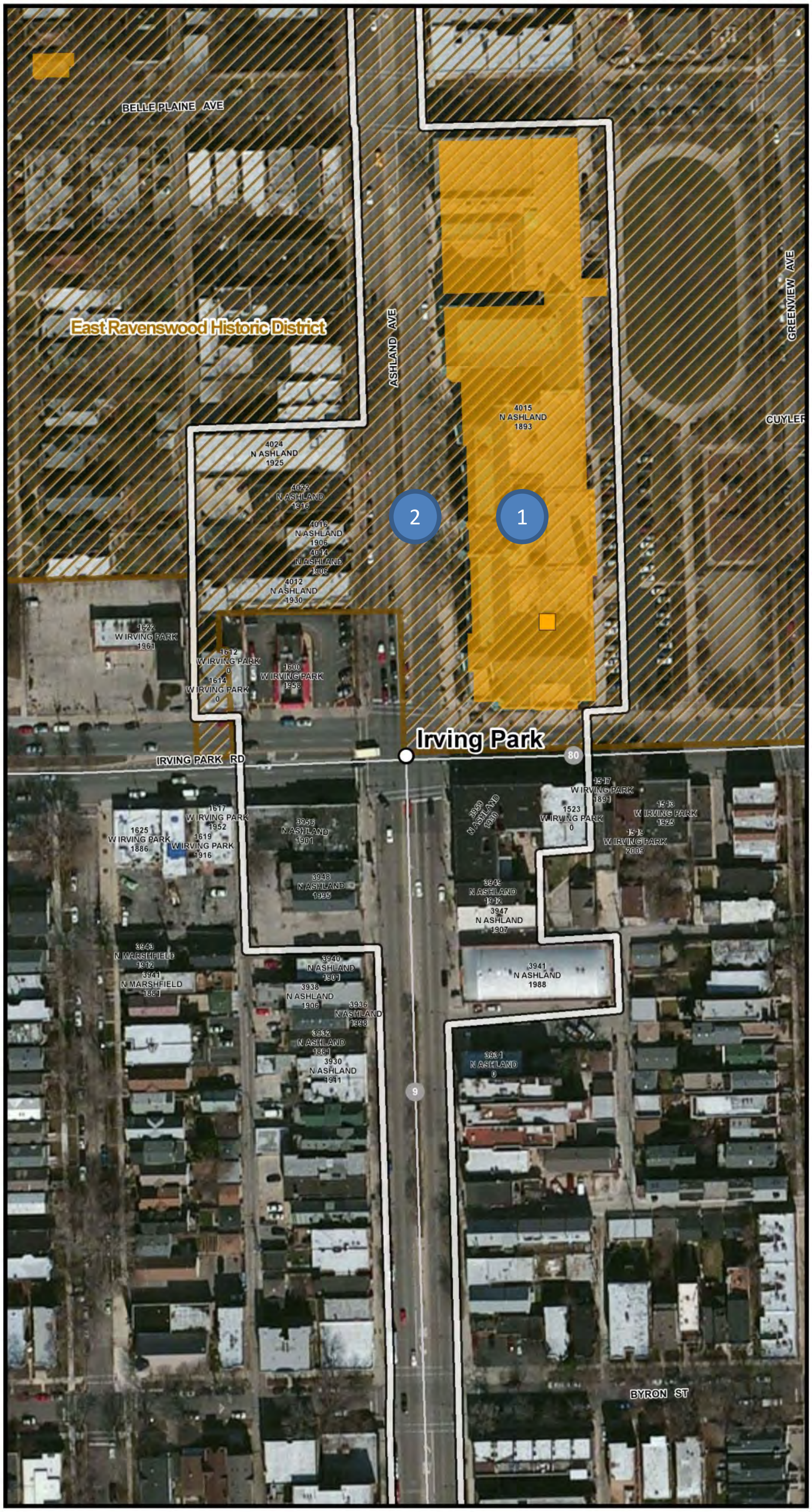


4015 North Ashland Avenue



East Ravenswood Historic District

Station Area 1: Irving Park Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 4: Belmont

The intersection is a typical urban environment full of activity and characterized by a combination of late 19th and early 20th century mixed-use, multi-family residential, and modern mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

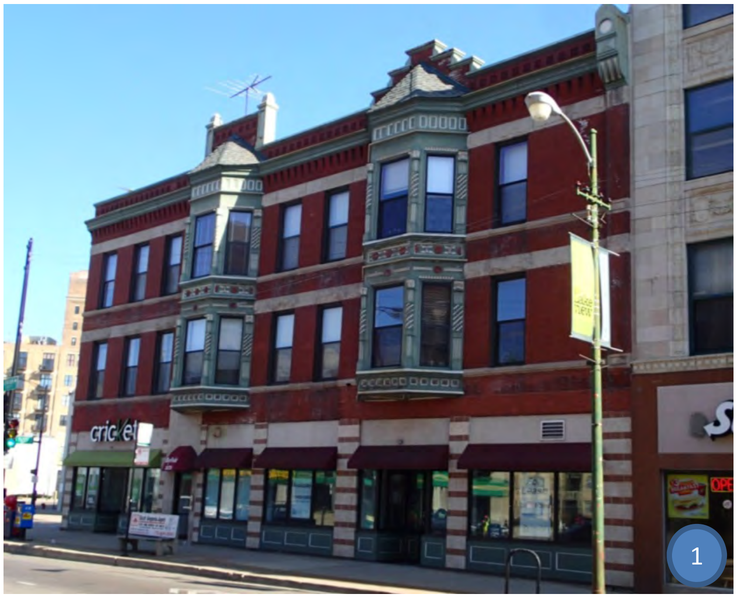
Property / Description	Date	CHRS	Landmark	NRHP
1. 3175 North Lincoln Avenue: Classical Revival Mixed Use Building	1890s	No	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

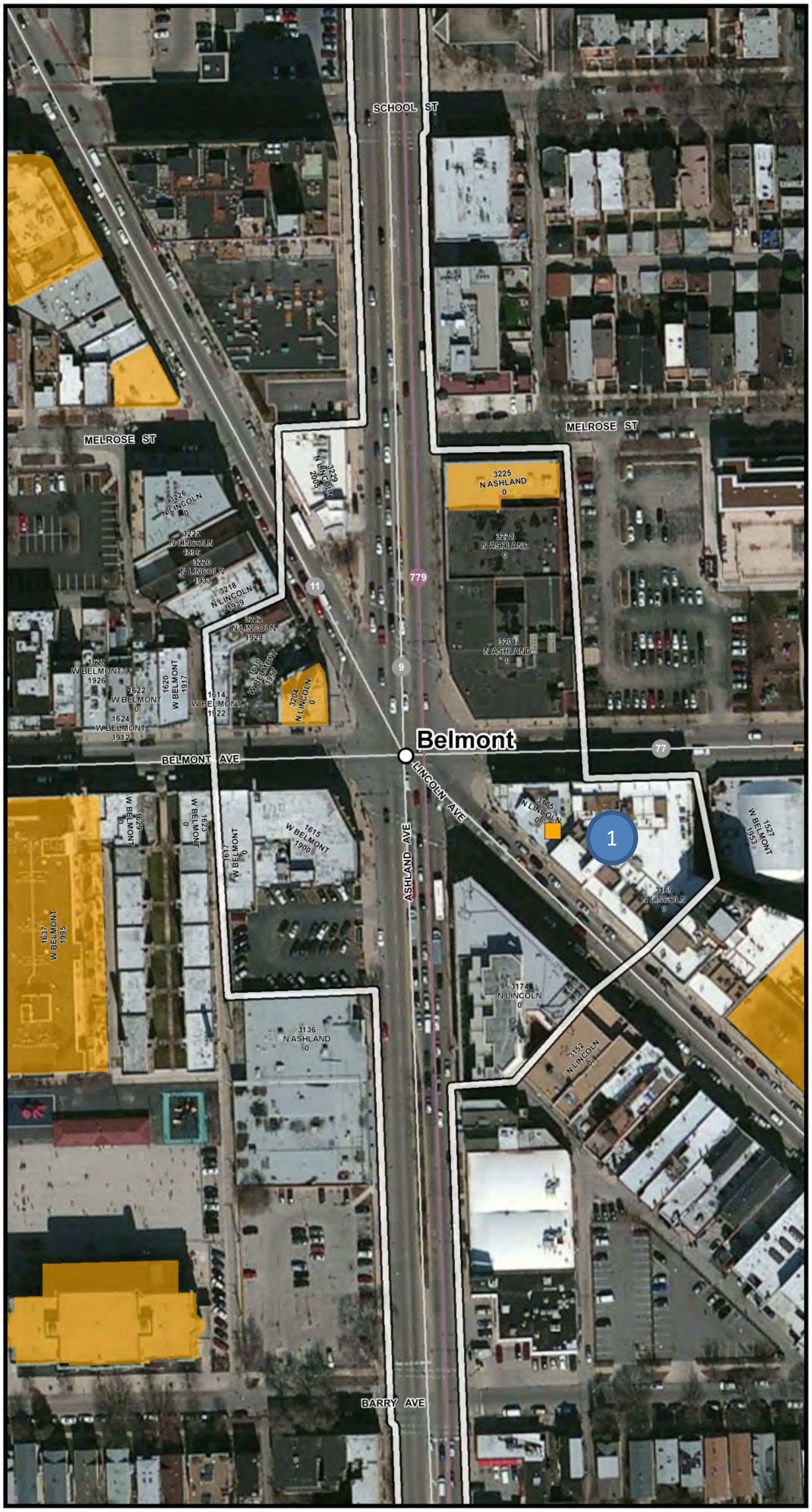
Property	No Adverse Effect
1. 3175 North Lincoln Avenue	- Median Station north or south of Belmont Ave - SB Curbside Station north or south of Belmont Ave - NB Curbside Station north or south of Belmont Ave

Photos:



3175 North Lincoln Avenue

Station Area 4: Belmont Cont'd



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Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

● CTA Bus Route

● PACE Bus Route

Metra Commuter Rail

Metra

■ Recommended Eligible

■ CHRS Orange

■ CHRS Red

▨ Chicago Historic District

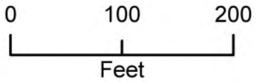
▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale



Station Area 9: Division

The intersection is a typical urban environment full of activity and characterized by a combination of late 19th and early 20th century mixed-use, multi-family residential, and modern mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 1543 West Division Street: Classical Revival Mixed Use Building	1920s	No	No	Recommended Eligible
2. 1200 North Ashland Avenue: Classical Revival Mixed Use Bldg.	1920s	Orange	Yes	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

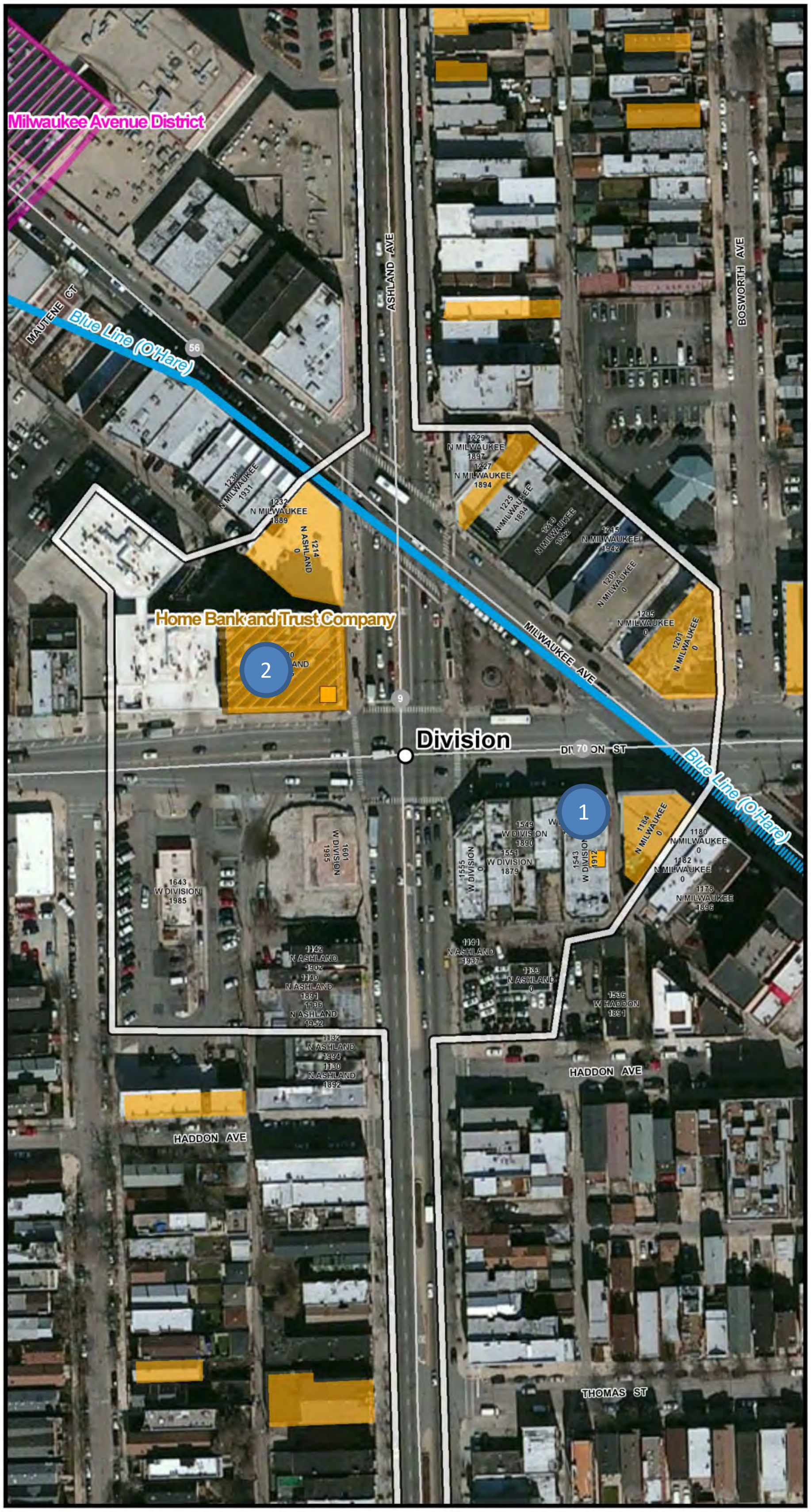
Property	No Adverse Effect
1. 1543 West Division Street	- Median Station north or south of Division St - SB Curbside Station north or south of Division St - NB Curbside Station north or south of Division St
2. 1200 North Ashland Avenue	- Median Station north or south of Division St - SB Curbside Station south of Division St - NB Curbside Station north or south of Division St - SB Curbside Station north of Division St*
*** Due to design of station being similar in size and scale to existing shelters along the corridor**	

Photos:

1543 West Division Street

1200 North Ashland Avenue

Station Area 9: Division Cont'd



Inset

Legend

- ○ Proposed BRT Station
- ▭ Area of Potential Effect

CTA and Pace Bus Routes

- 201 CTA Bus Route
- 208 PACE Bus Route

Metra Commuter Rail

- Metra

- 🟧 Recommended Eligible
- 🟧 CHRS Orange
- 🟥 CHRS Red
- ▨ Chicago Historic District
- ▨ National Register of Historic Places
- ▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

- ① Photograph ID

Scale

0 100 200
Feet

Station Area 12: Lake

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, commercial, and recreational buildings as well as modern buildings. In addition the Lake Street train station is present. The buildings appear to be in good condition. The following NRHP historic resources were identified within this station area:

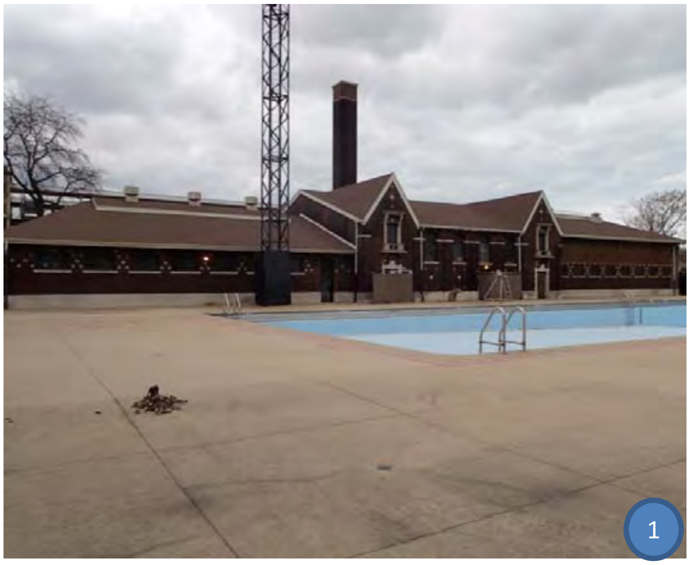
Property / Description	Date	CHRS	Landmark	NRHP
1. 1545 West Lake Street: Art Deco/Moderne Gymnasium	1900s	Orange	No	Recommended Eligible
2. Queen Anne Train Station: Lake Street at Ashland Avenue	1890s	Orange	No	Recommended Eligible
3. 238 North Ashland Avenue: Vernacular Commercial Building	1910s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1545 West Lake Street	- Median Station north or south of Lake St - SB Curbside Station north or south of Lake St - NB Curbside Station north or south of Lake St
2. Queen Anne Train Station	- Median Station north or south of Lake St - SB Curbside Station north or south of Lake St - NB Curbside Station north or south of Lake St
3. 238 North Ashland Avenue	- Median Station north or south of Lake St - SB Curbside Station north or south of Lake St - NB Curbside Station north or south of Lake St

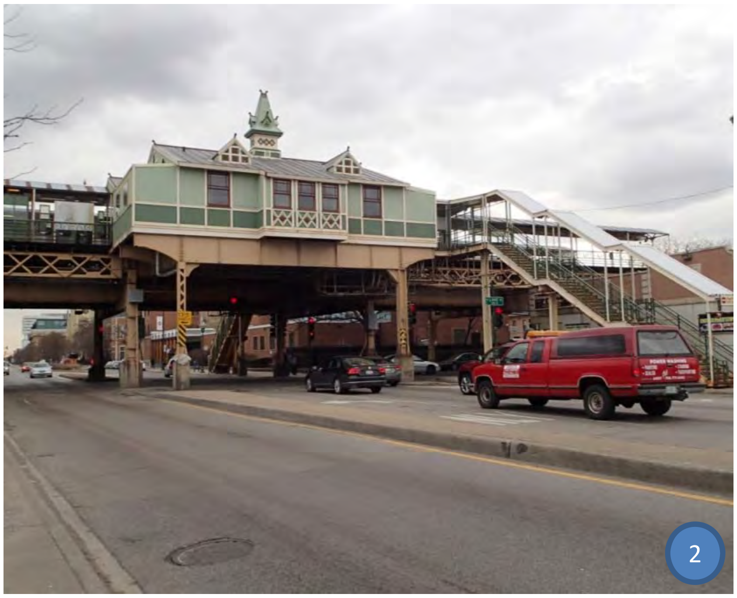
Photos (Cont'd on Next Page):



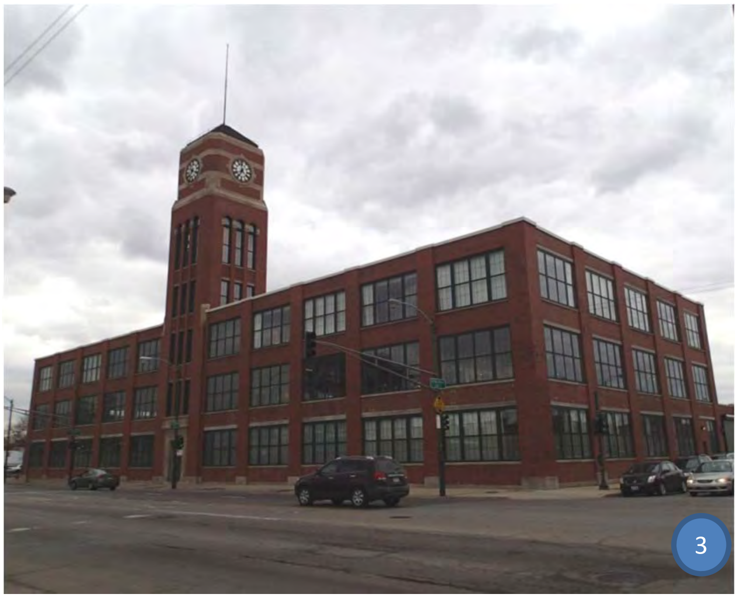
1545 West Lake Street

Station Area 12: Lake Cont’d

Photos Cont’d:

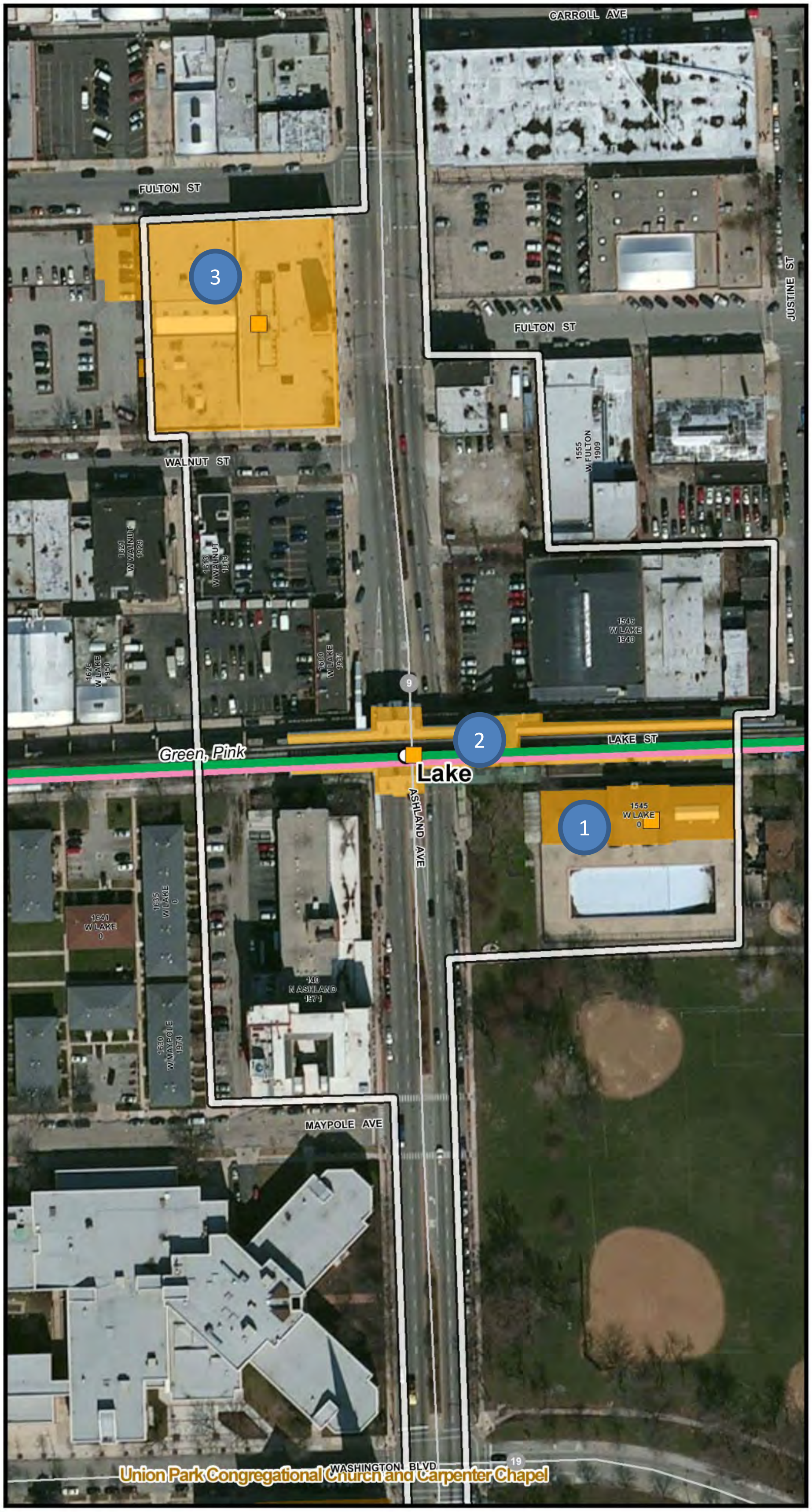


Queen Anne Train Station



238 North Ashland Avenue

Station Area 12: Lake Cont'd



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Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

CTA Bus Route

PACE Bus Route

Metra Commuter Rail

Metra

Recommended Eligible

CHRS Orange

CHRS Red

Chicago Historic District

National Register of Historic Places

Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 13: Madison

The intersection has experienced a slight downturn in activity and development as it is characterized by a combination of early 20th century mixed-use buildings and modern buildings along with vacant lots. The buildings appear to be in good condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 1521 West Warren Boulevard: Art Deco/Moderne Hotel	1920s	Orange	Yes	Listed

Effects Assessment:

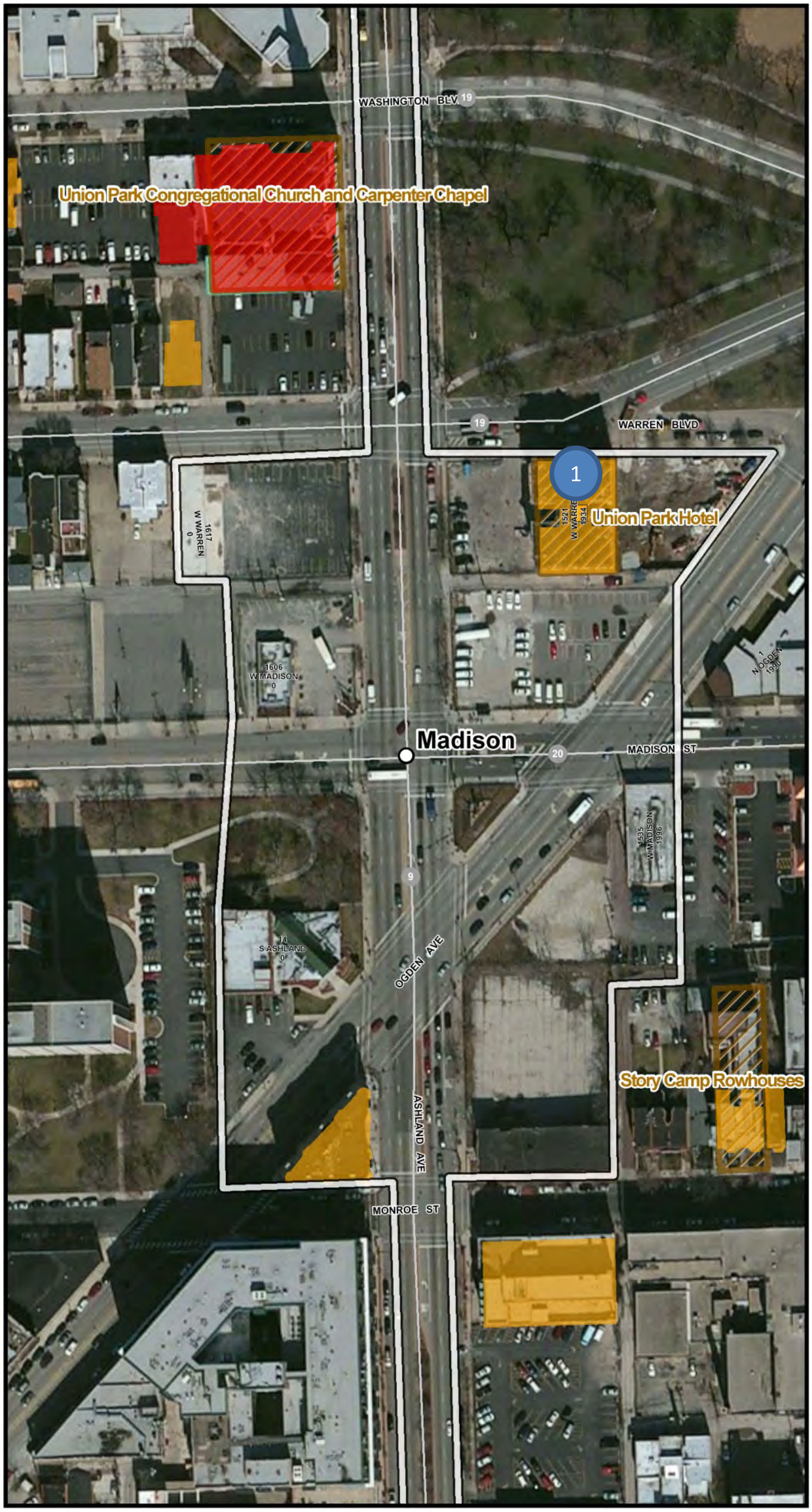
For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1521 West Warren Boulevard	- Median Station north or south of Madison St - SB Curbside Station north or south of Madison St - NB Curbside Station north or south of Madison St

Photos:

1521 West Warren Boulevard

Station Area 13: Madison Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 14: Jackson

The intersection falls within the West Jackson Boulevard Historic District and contains late 19th and early 20th century mixed-use, commercial, and multi-family residences, as well as modern multi-family residences and commercial buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 315 South Ashland Avenue: Romanesque Revival Residential Bldg.	1890s	Orange	No	Recommended Eligible; Contributing element within the West Jackson Boulevard Historic District
2. 1539 West Jackson Boulevard: Romanesque Revival Residential Bldg.	1889	Orange	Yes	Recommended Eligible; Contributing element within the West Jackson Boulevard Historic District
3. 236-238 South Ashland Avenue: Italianate Mixed Use Building	1889	Orange	No	Recommended Eligible
4. West Jackson Boulevard HD: a collection of 40 buildings on 8.5 acres along Jackson Blvd	1876-1890	n/a	Local District	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

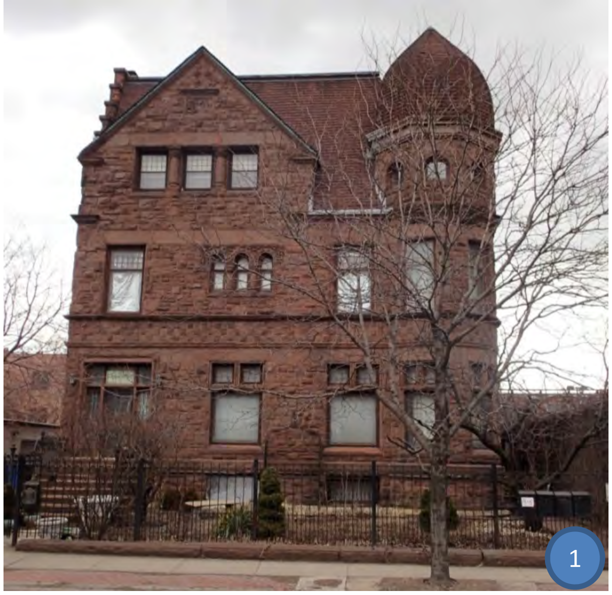
Property	No Adverse Effect
1. 315 South Ashland Avenue	- Median Station north or south of Jackson Blvd - SB Curbside Station north or south of Jackson Blvd - NB Curbside Station north of Jackson Blvd - NB Curbside Station south of Jackson Blvd*
2. 1539 West Jackson Boulevard	- Median Station north or south of Jackson Blvd - SB Curbside Station north or south of Jackson Blvd - NB Curbside Station north or south of Jackson Blvd
3. 236-238 South Ashland Avenue	- Median Station north or south of Jackson Blvd - SB Curbside Station north or south of Jackson Blvd - NB Curbside Station north or south of Jackson Blvd
4. West Jackson Boulevard Historic District	- SB Curbside Station north or south of Jackson Blvd -Median Station or NB Curbside Stations**

* Due to design of station being similar in size and scale to existing shelters along the corridor

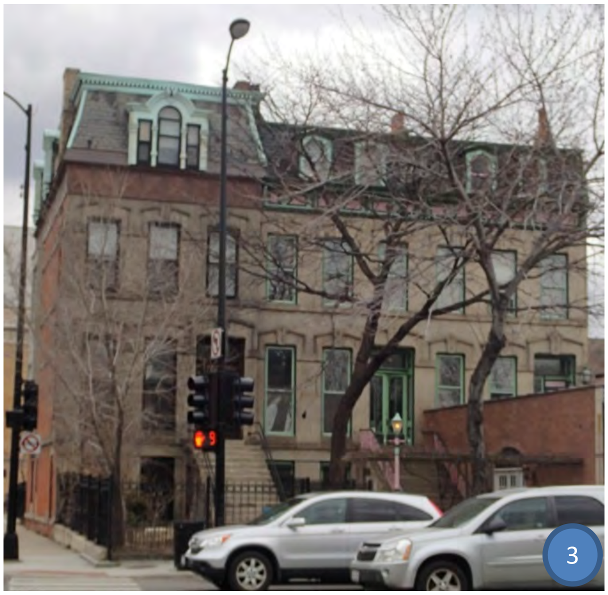
** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor

Station Area 14: Jackson Cont’d

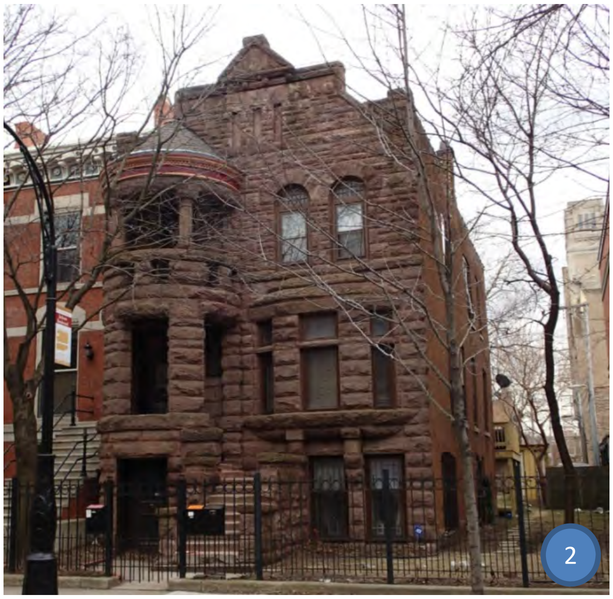
Photos:



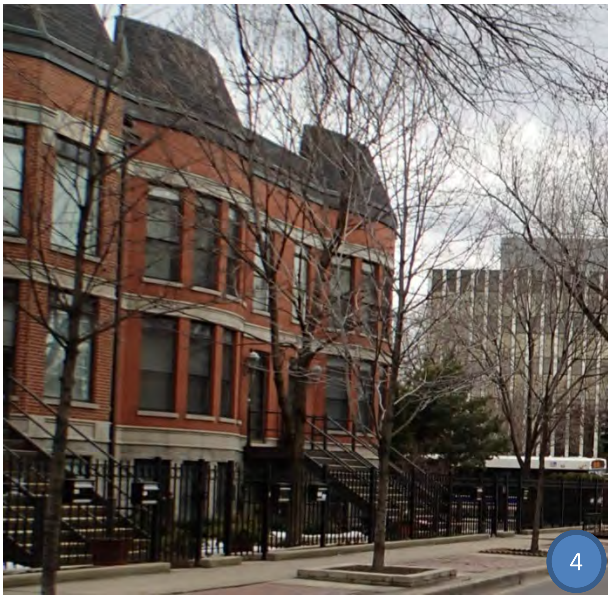
315 South Ashland Avenue



236-238 South Ashland Avenue

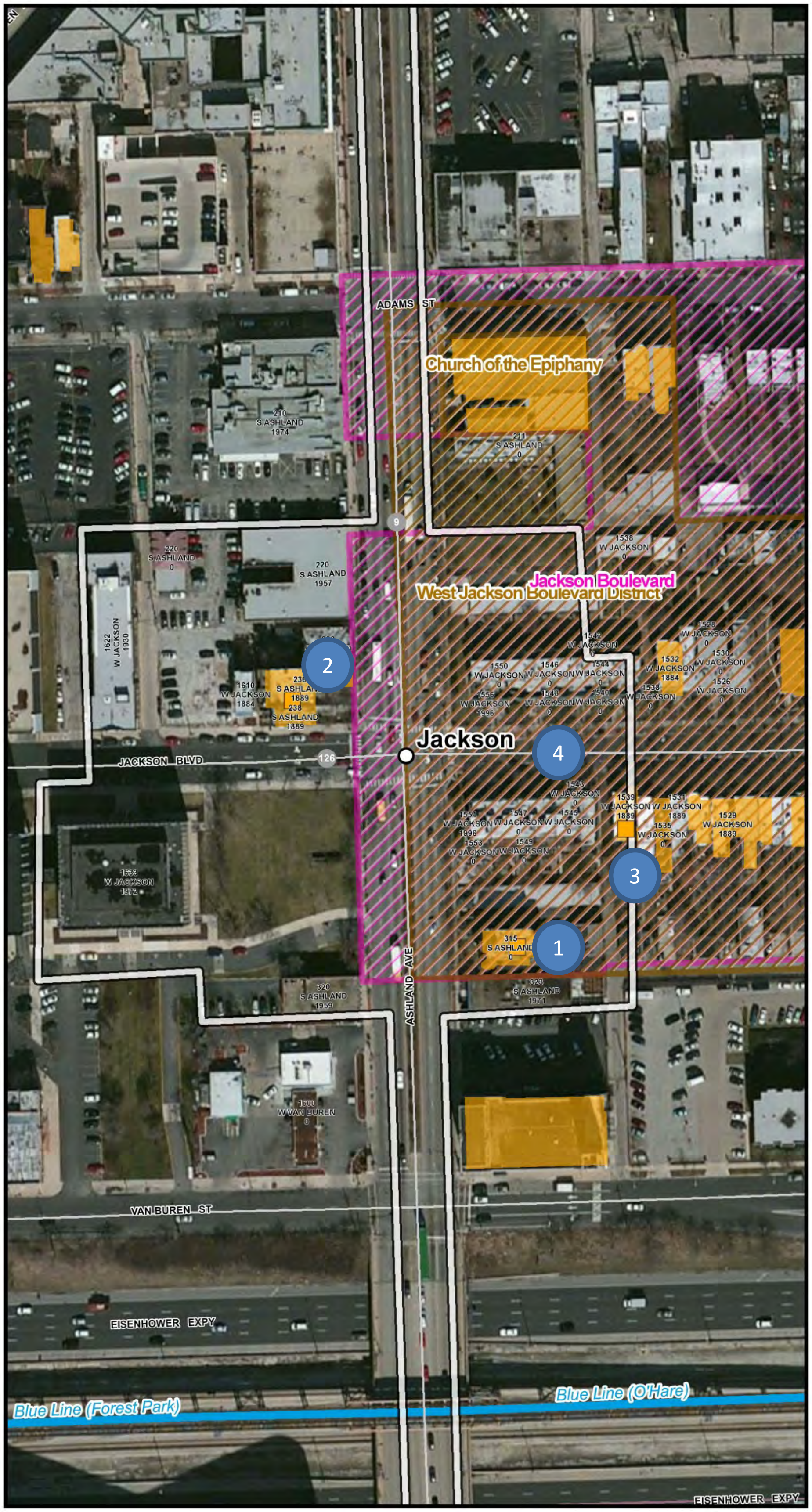


1539 West Jackson Boulevard



West Jackson Historic District

Station Area 14: Jackson Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 16: Polk

The intersection is a typical urban environment full of activity and characterized by a large mid-20th century hospital, modern buildings, and associated parking lots, as well as a religious facility. The buildings appear to be in excellent condition. The following NRHP historic resources were identified within this station area:

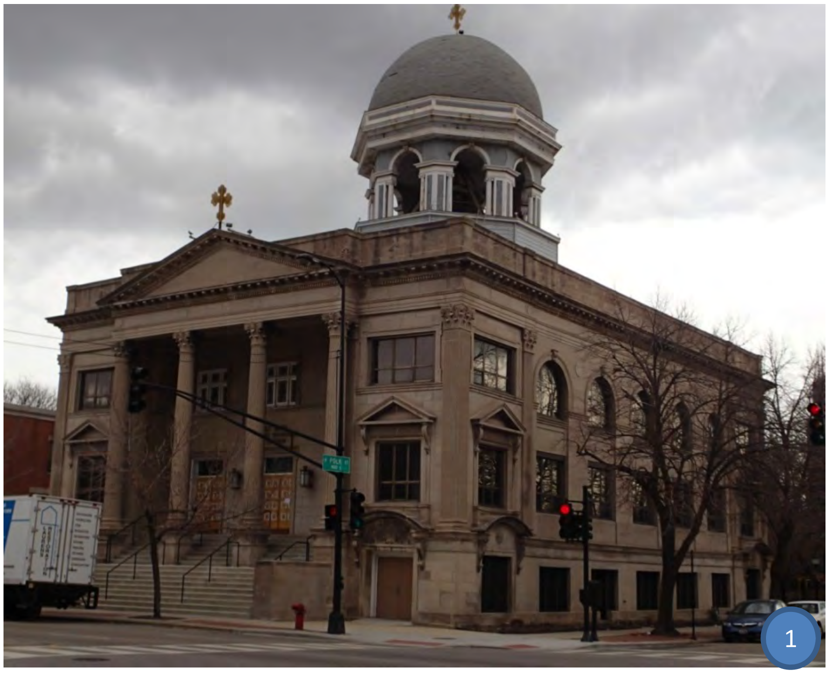
Property / Description	Date	CHRS	Landmark	NRHP
1. 733 South Ashland Avenue: Classical Revival Church	1910s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

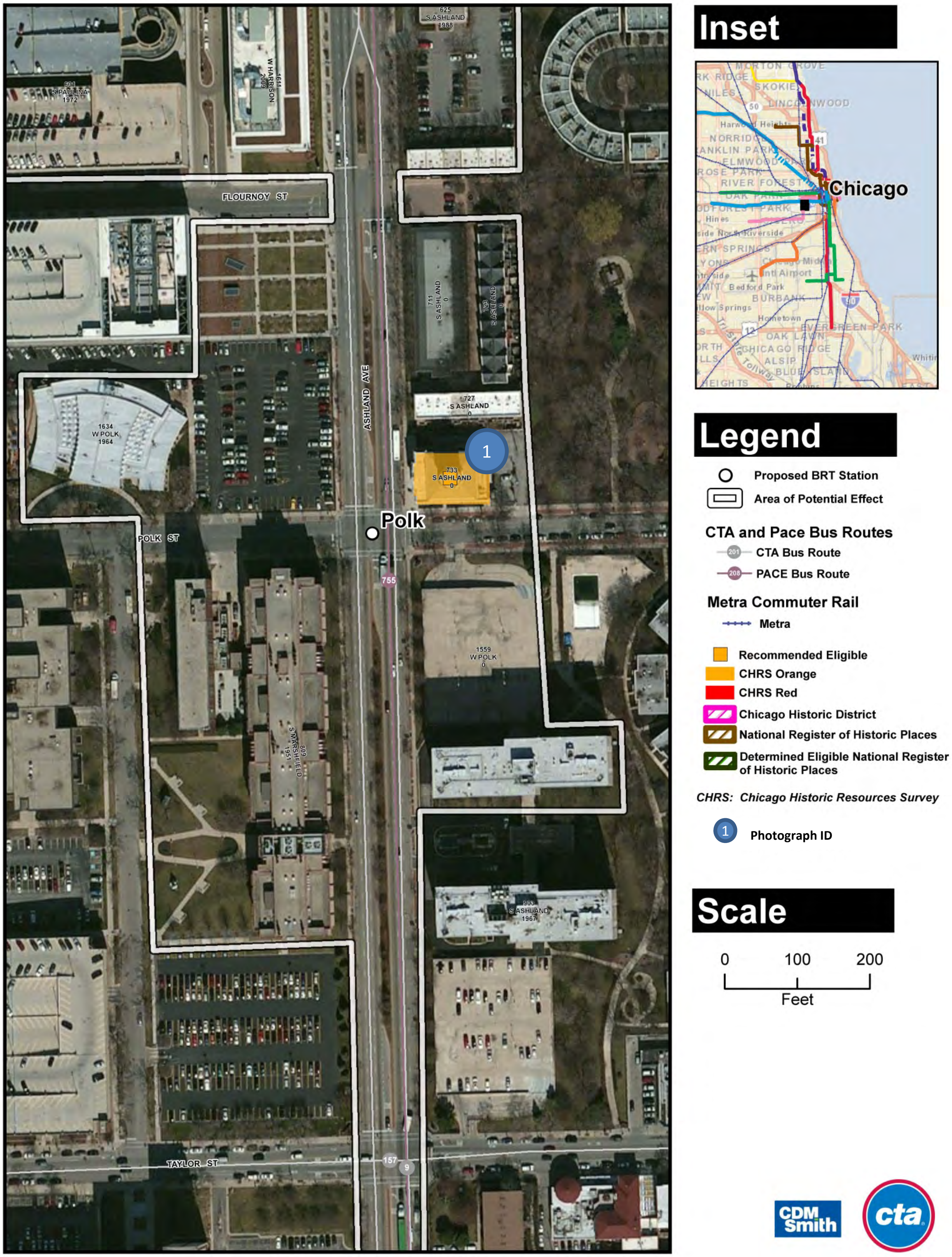
Property	No Adverse Effect
1. 733 South Ashland Avenue	- Median Station north or south of Polk St - SB Curbside Station north or south of Polk St - NB Curbside Station south of Polk St - NB Curbside Station north of Polk St*
*** Due to design of station being similar in size and scale to existing shelters along the corridor**	

Photos:



733 South Ashland Avenue

Station Area 16: Polk Cont'd



Station Area 17: Roosevelt

The intersection is a typical urban environment full of activity and characterized by a majority of modern mixed-use commercial buildings, including a gas station and apartments. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

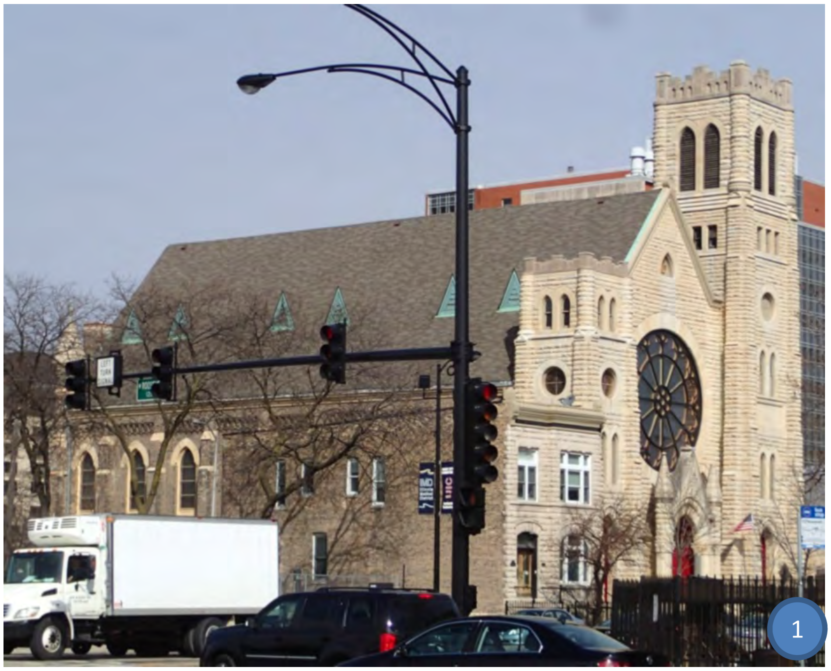
Property / Description	Date	CHRS	Landmark	NRHP
1. 1132 South Ashland Avenue: Gothic Revival Church	1880s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

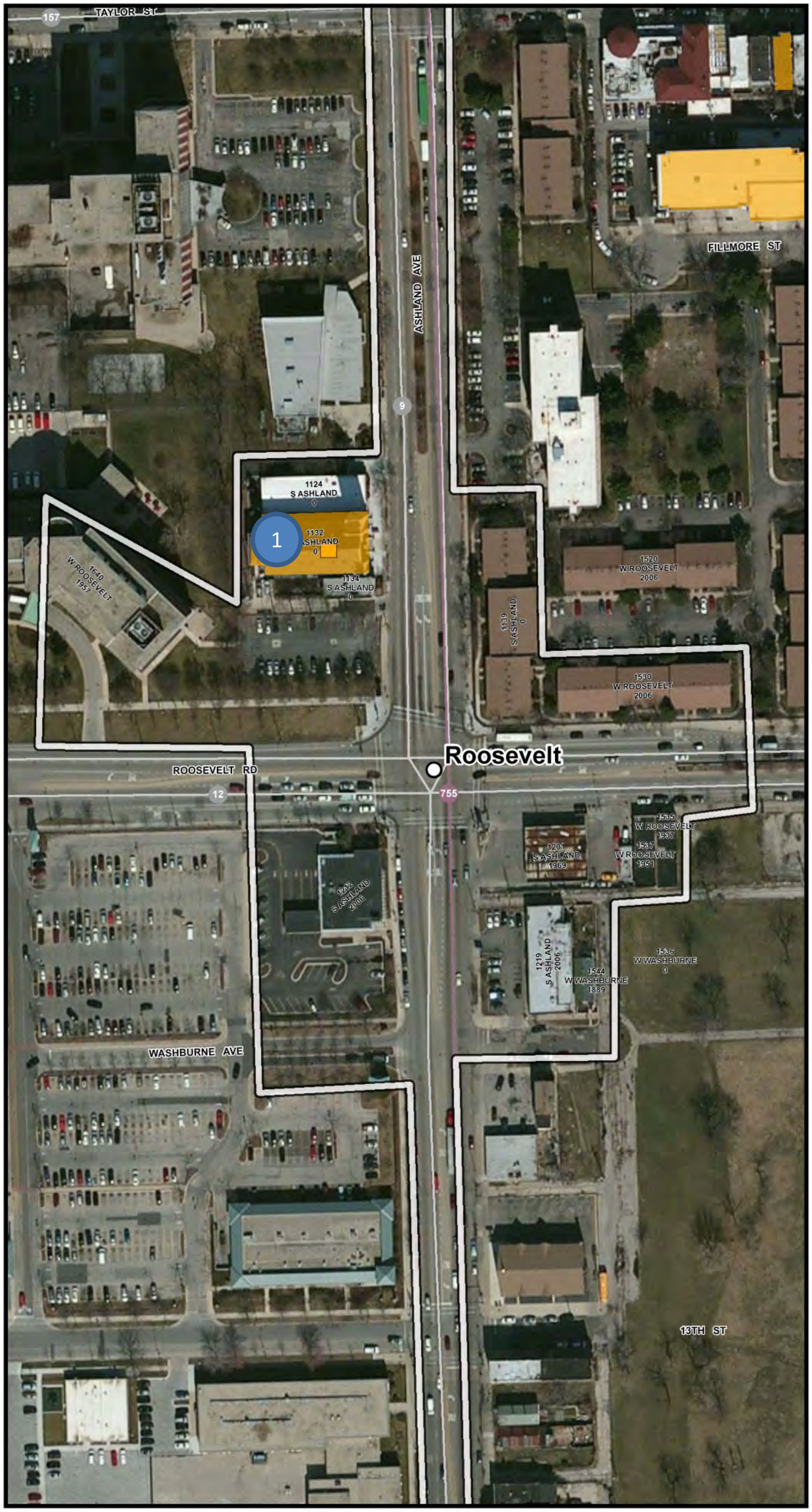
Property	No Adverse Effect
1. 1132 South Ashland Avenue	- Median Station north or south of Roosevelt Rd - SB Curbside Station north or south of Roosevelt Rd - NB Curbside Station north or south of Roosevelt Rd

Photos:



1132 South Ashland Avenue

Station Area 17: Roosevelt Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 18: 18th

The intersection falls within the Pilsen Historic District and contains late 19th and early 20th century mixed-use, commercial, and multi-family residences. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 1812 South Ashland Avenue: Renaissance Revival Mixed Use Bldg.	1890s	Orange	No	Recommended Eligible; Contributing element within the Pilsen Historic District
2. Pilsen Historic District : a collection of over 4,400 residential, commercial, and industrial buildings roughly bounded by 16th Street, Cermak Road, Halsted Street, and Western Avenue.	1871-1956	n/a	n/a	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1812 South Ashland Avenue	- Median Station north or south of 18th St - SB Curbside Station north of 18th St - NB Curbside Station north or south of 18th St - SB Curbside Station south of 18th St*
2. Pilsen Historic District	- All six possible Station locations**

* Due to design of station being similar in size and scale to existing shelters along the corridor

** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor

Photos:

See Next Page

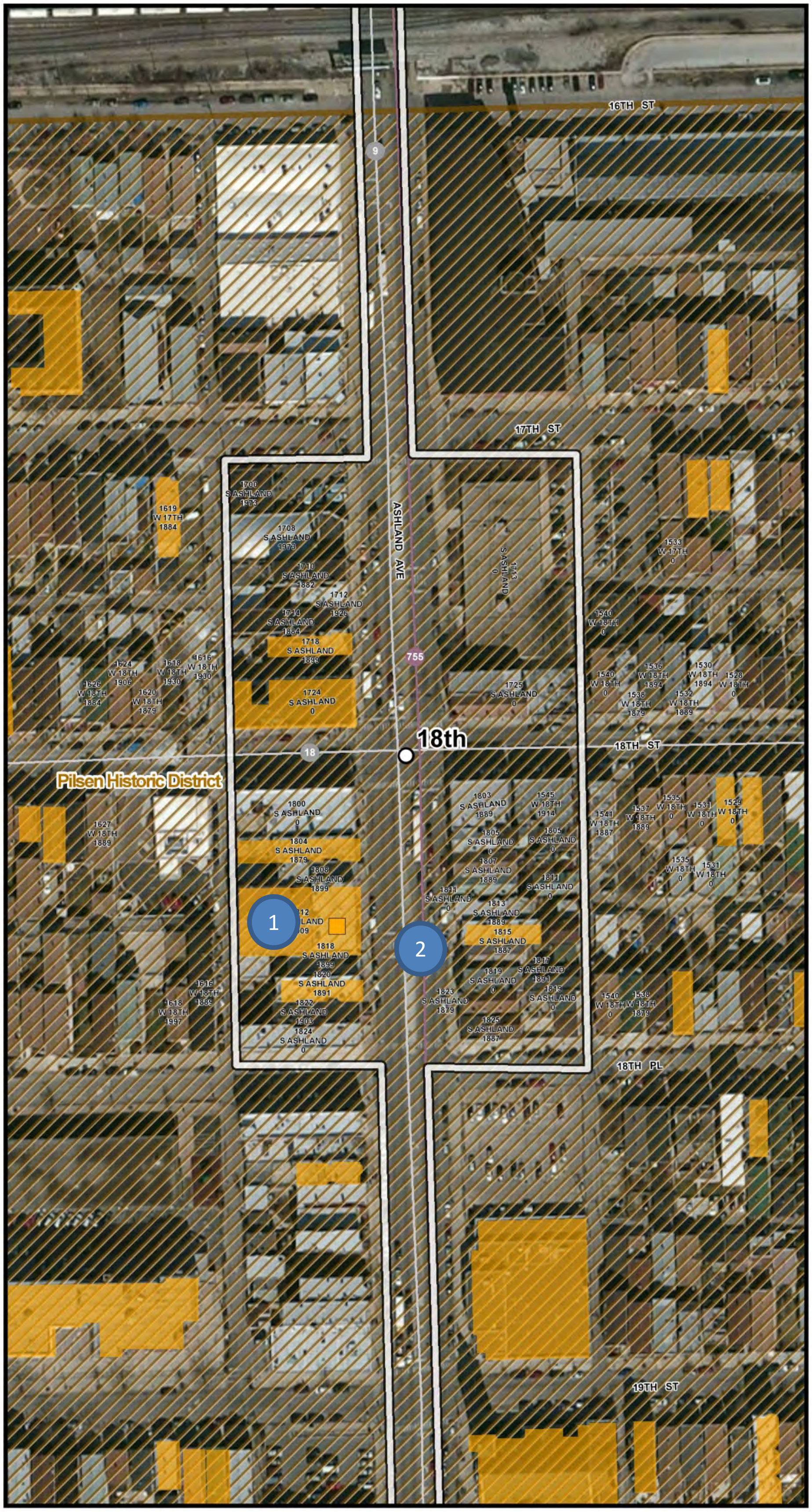
Station Area 18: 18th Cont’d

Photos:

1812 South Ashland Avenue

Pilsen Historic District

Station Area 18: 18th Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

■ Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

● Photograph ID

Scale

0 100 200

Feet

Station Area 19: Blue Island

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, commercial, and modern buildings including a gas station and school. The Pilsen Historic District begins on the north side of the intersection. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

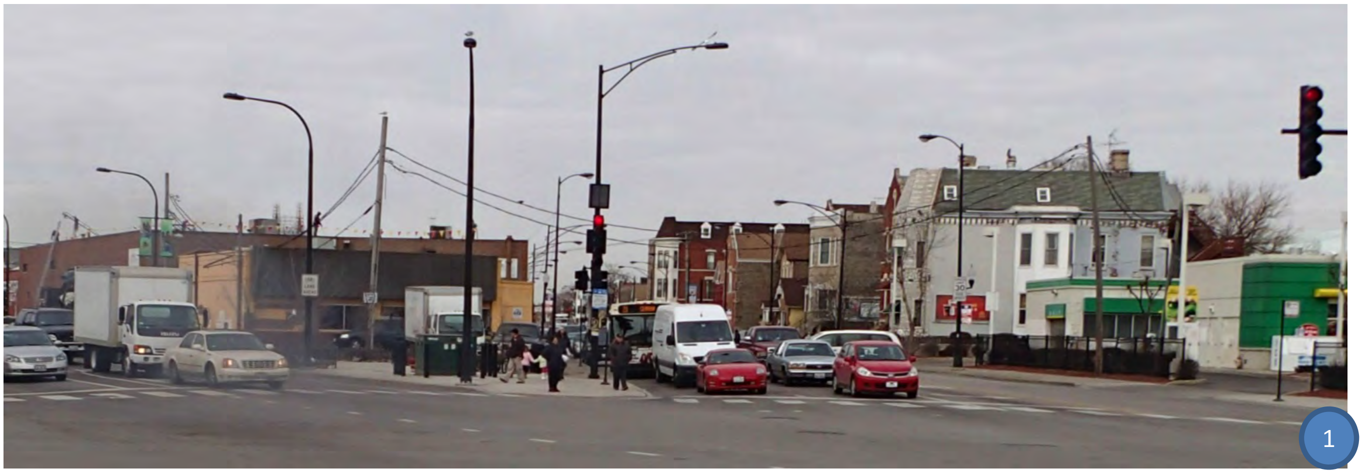
Property / Description	Date	CHRS	Landmark	NRHP
1. Pilsen Historic District : a collection of over 4,400 residential, commercial, and industrial buildings roughly bounded by 16th Street, Cermak Road, Halsted Street, and Western Avenue.	1871-1956	n/a	n/a	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

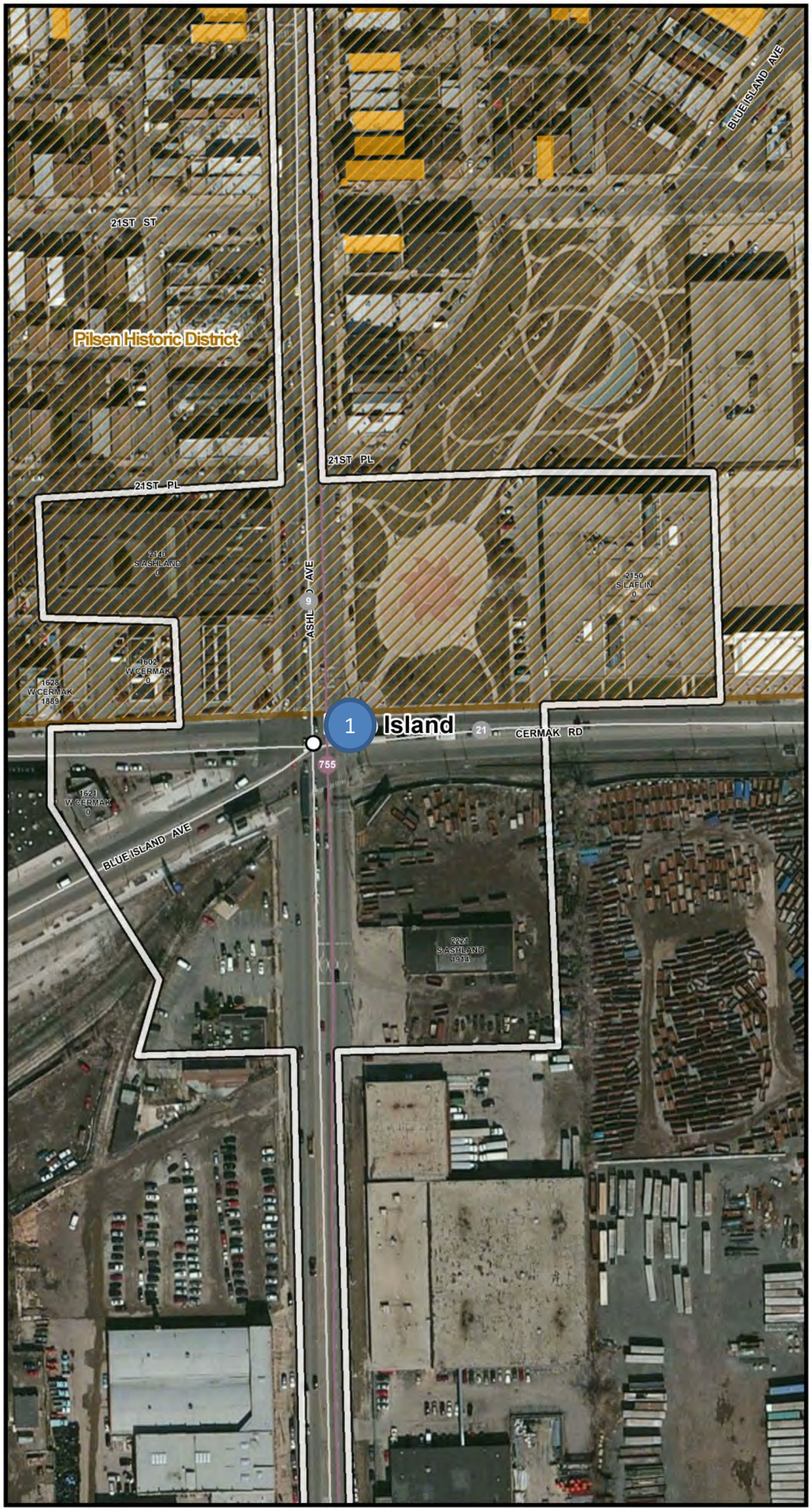
Property	No Adverse Effect
1. Pilsen Historic District	- Median Station north or south of Cermak Rd - SB Curbside Station north or south of Cermak Rd - NB Curbside Station north or south of Cermak Rd

Photos:



Pilsen Historic District

Station Area 19: Blue Island Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 21: 35th

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, industrial, and modern buildings including a gas station and retail. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

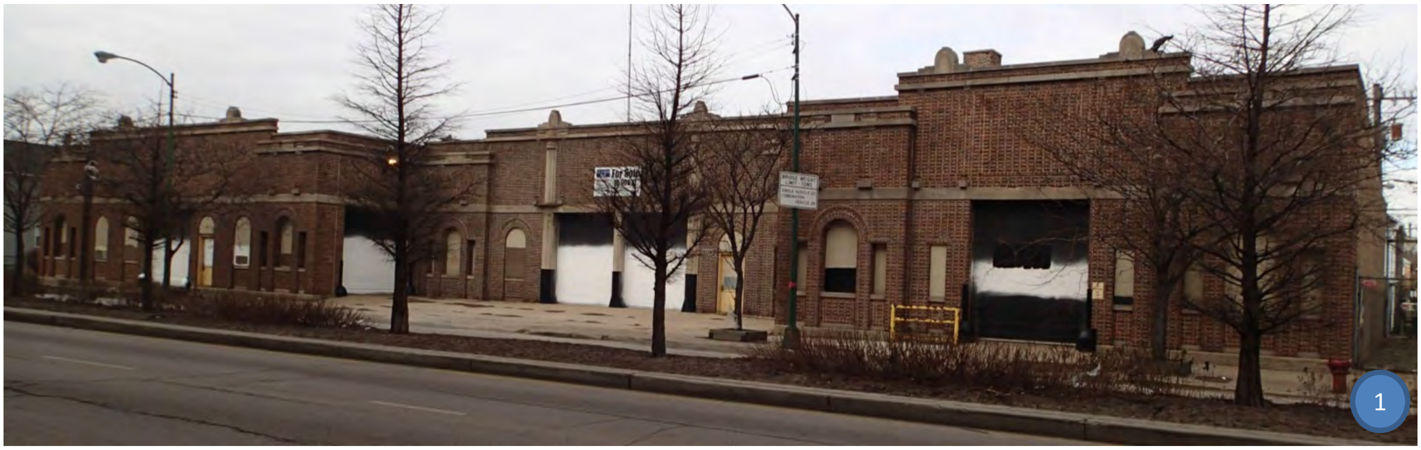
Property / Description	Date	CHRS	Landmark	NRHP
1. 3538 South Ashland Avenue: Industrial Building	1910s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

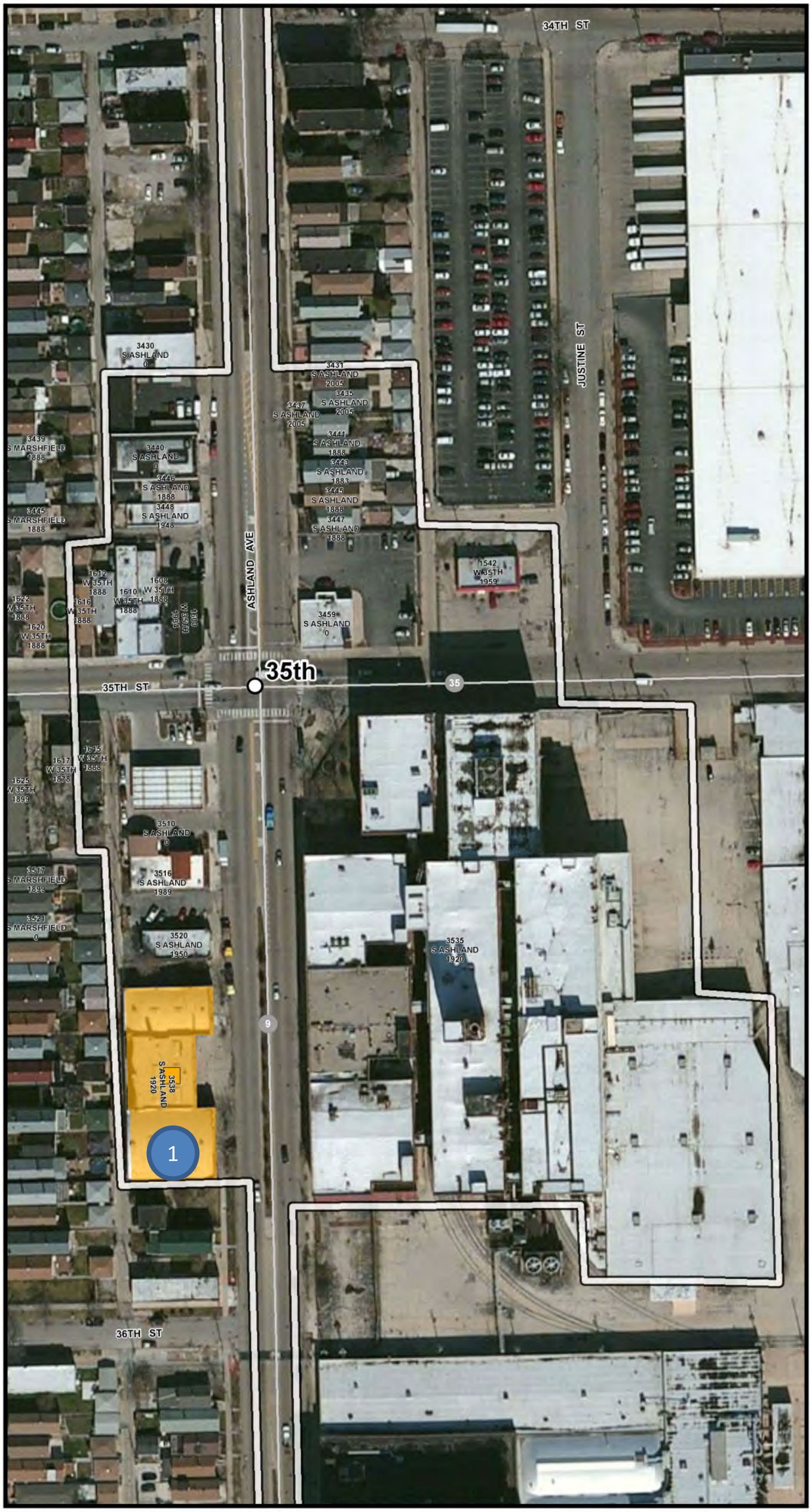
Property	No Adverse Effect
1. 3538 South Ashland Avenue	- Median Station north or south of 35th St - SB Curbside Station north or south of 35th St - NB Curbside Station north or south of 35th St

Photos:



3538 South Ashland Avenue

Station Area 21: 35th Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 24: 47th

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use/retail and modern buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

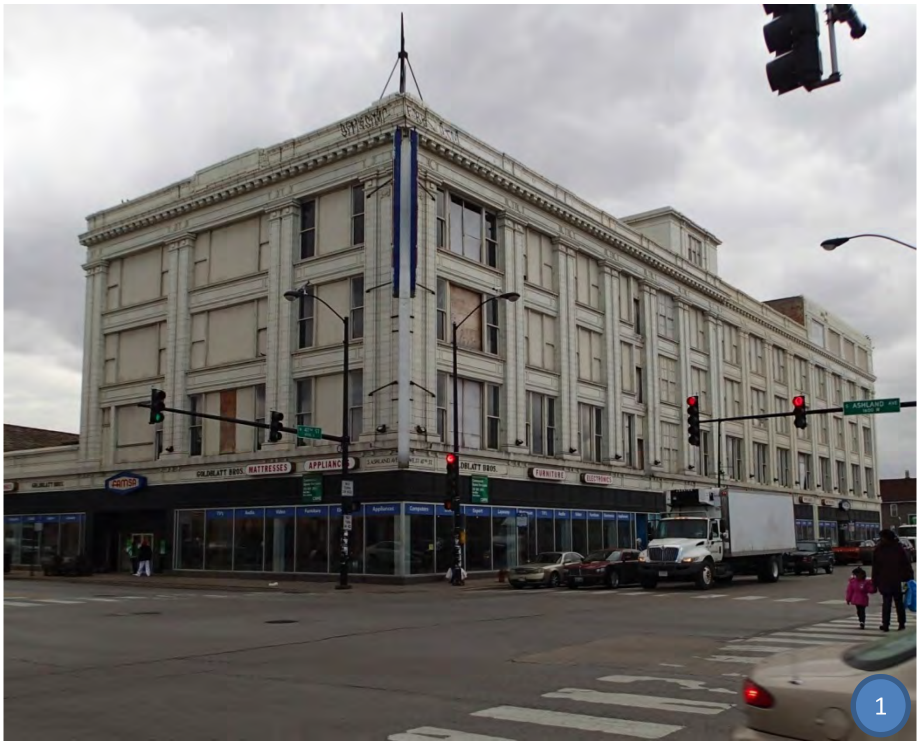
Property / Description	Date	CHRS	Landmark	NRHP
1. 4700 South Ashland Avenue: Goldblatt Brothers Department Store	1910s	Orange	Yes	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

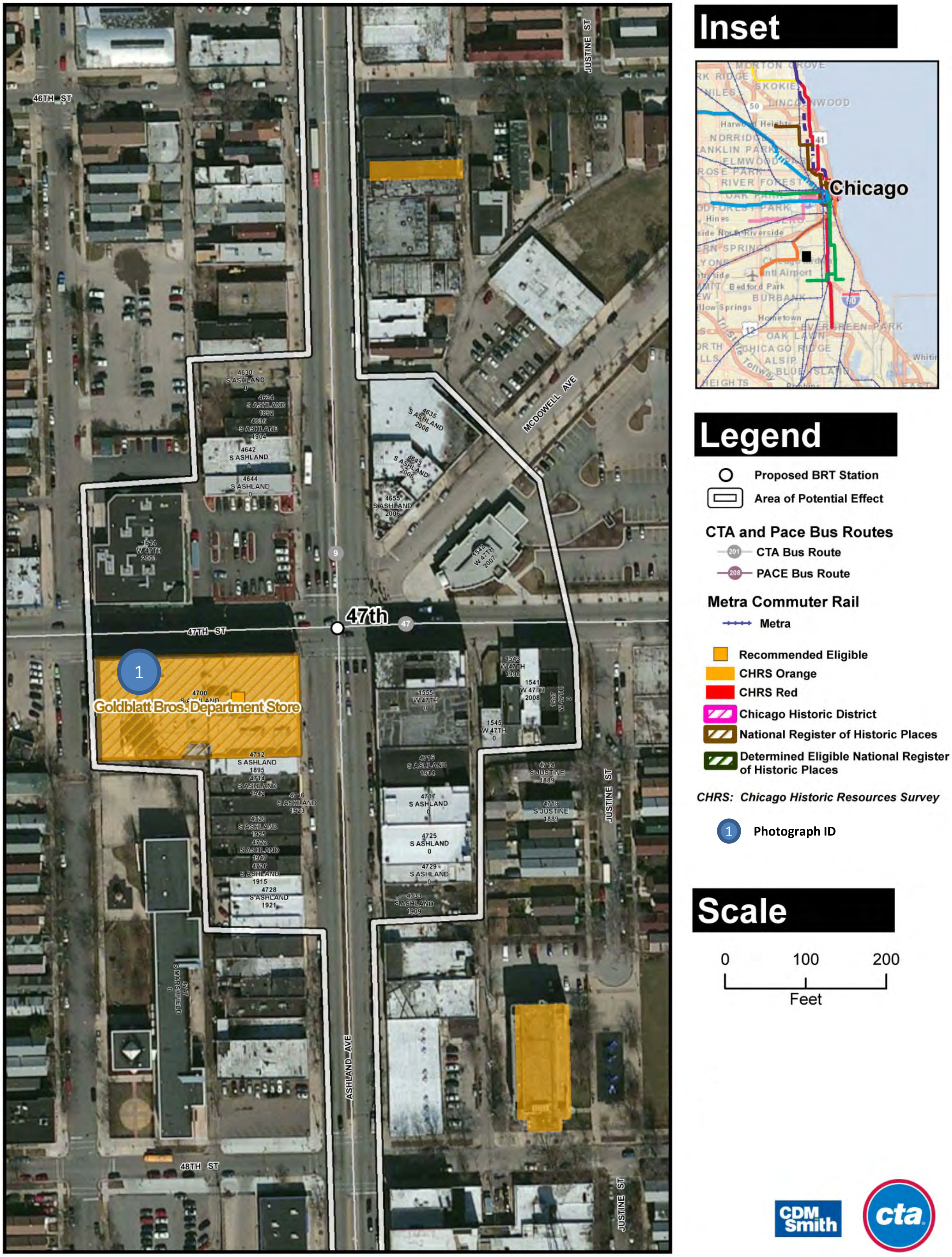
Property	No Adverse Effect
1. 4700 South Ashland Avenue	- Median Station north or south of 47th St - SB Curbside Station north of 47th St - NB Curbside Station north or south of 47th St - SB Curbside Station south of 47th St*
* Due to design of station being similar in size and scale to existing shelters along the corridor	

Photos:



4700 South Ashland Avenue

Station Area 24: 47th Cont'd



Station Area 25: 51st

The intersection has experienced a downturn in activity and development as it is characterized by several vacant lots and a combination of early 20th century mixed-use and modern buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

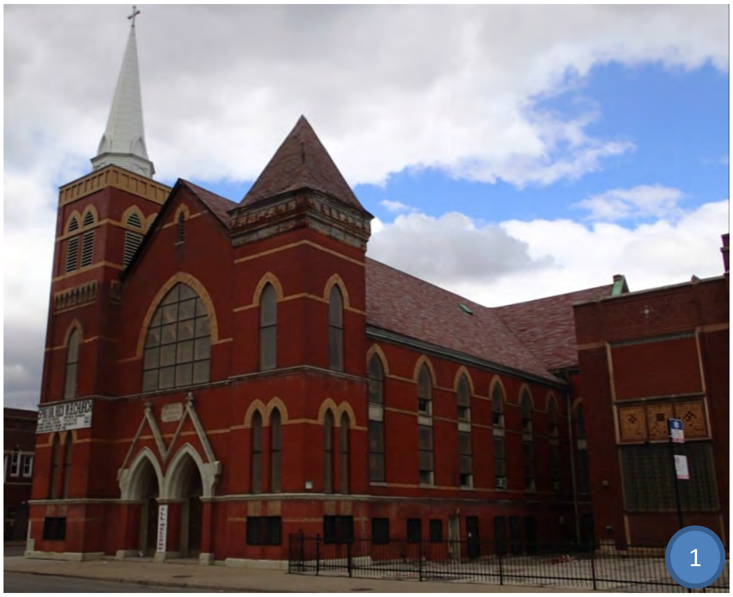
Property / Description	Date	CHRS	Landmark	NRHP
1. 1624 West 51st Street: Gothic Revival Church	1900s	Orange	No	Recommended Eligible
2. 1614 West 51st Street: Classical Revival School	1924	No	No	Recommended Eligible
3. 5043 South Ashland Avenue: Classical Revival Mixed Use Building	1893	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1624 West 51st Street	- Median Station north or south of 51st St - SB Curbside Station north or south of 51st St - NB Curbside Station north or south of 51st St
2. 1614 West 51st Street	- Median Station north or south of 51st St - SB Curbside Station north or south of 51st St - NB Curbside Station north or south of 51st St
3. 5043 South Ashland Avenue	- Median Station north or south of 51st St - SB Curbside Station north or south of 51st St - NB Curbside Station north or south of 51st St

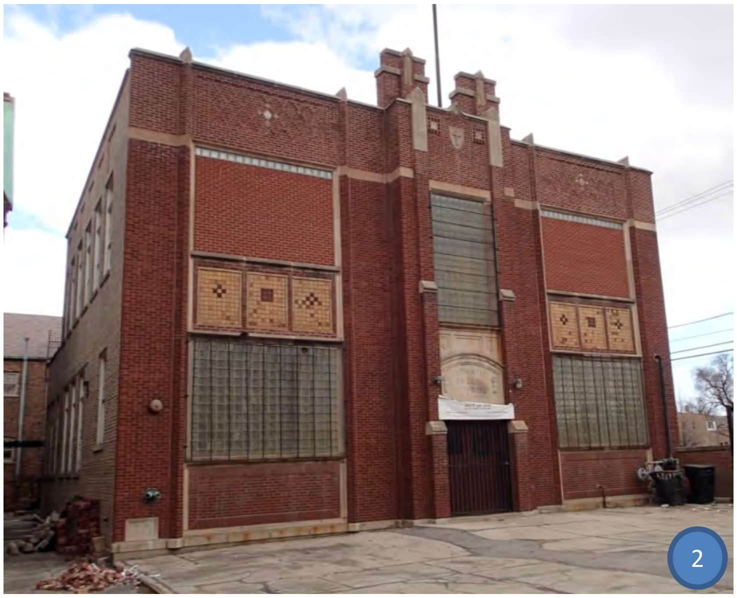
Photos (Cont'd on Next Page):



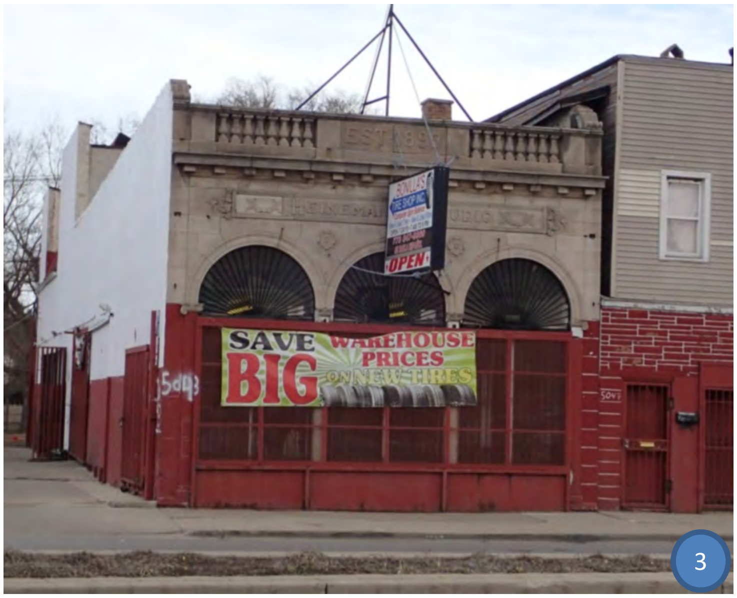
1624 West 51st Street

Station Area 25: 51st Cont'd

Photos Cont'd:

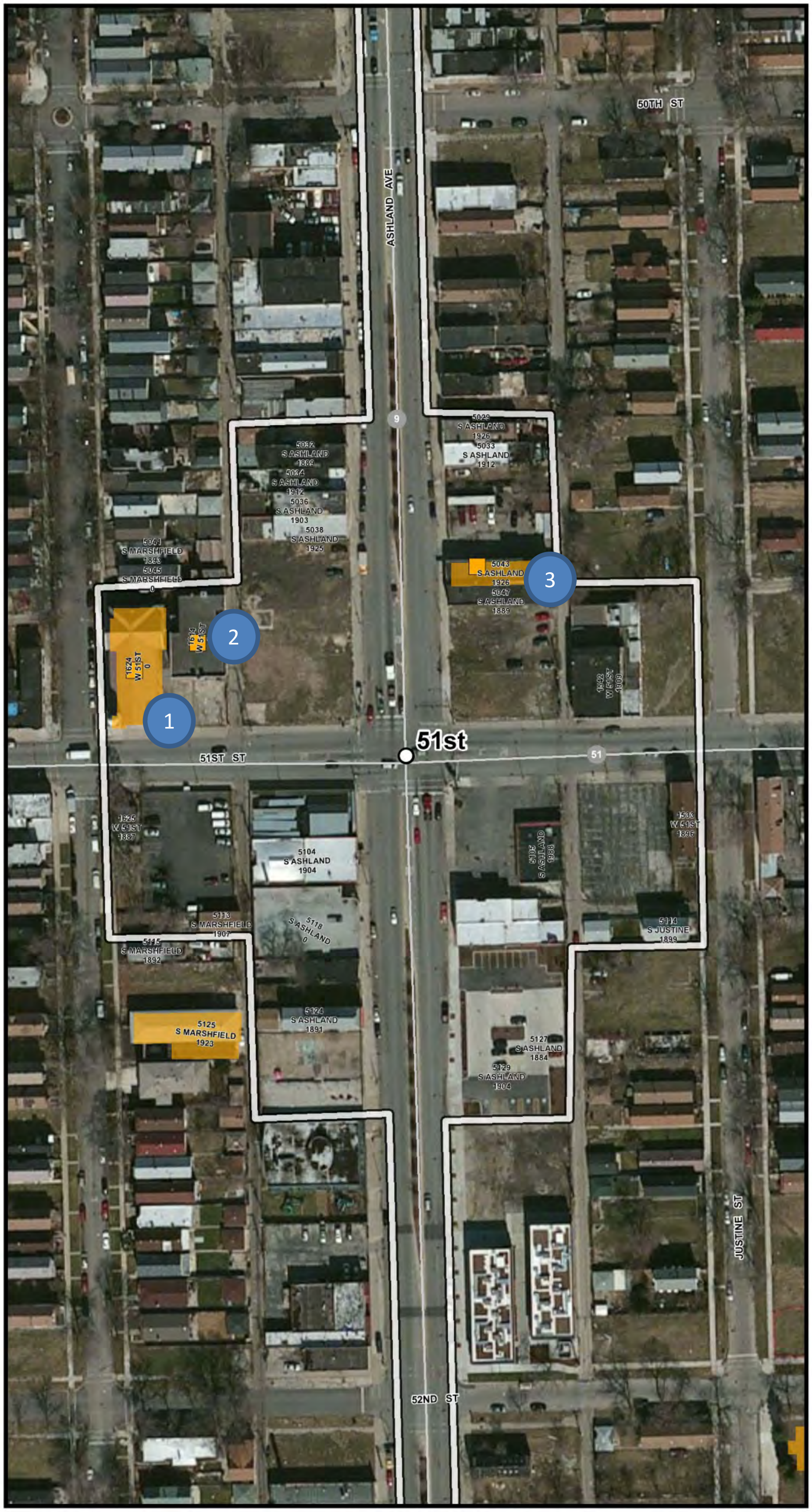


1614 West 51st Street



5043 South Ashland Avenue

Station Area 25: 51st Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

- (201) CTA Bus Route
- (208) PACE Bus Route

Metra Commuter Rail

- Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 26: Garfield

The intersection is a typical urban environment full of activity and characterized by several modern mixed-use and commercial buildings including retail, fast food and a gas station along with late 20th century multi-residential buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. Chicago Park Boulevard System Historic District	1896-1964	n/a	n/a	Determined Eligible

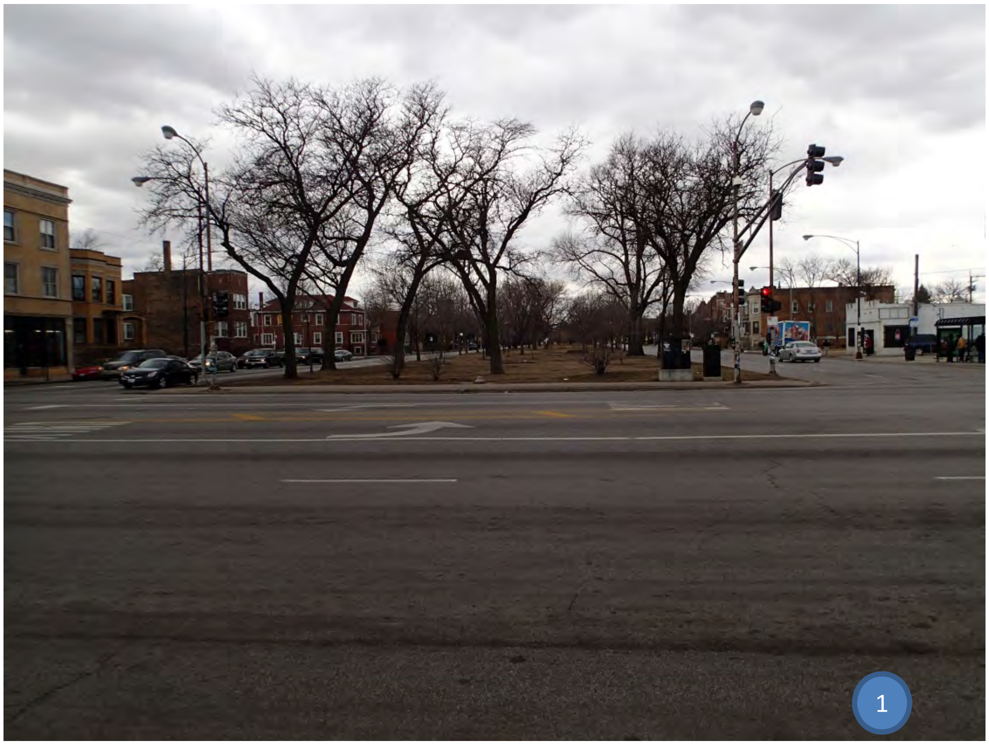
Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. Chicago Park Boulevard System	-All six possible Station locations**

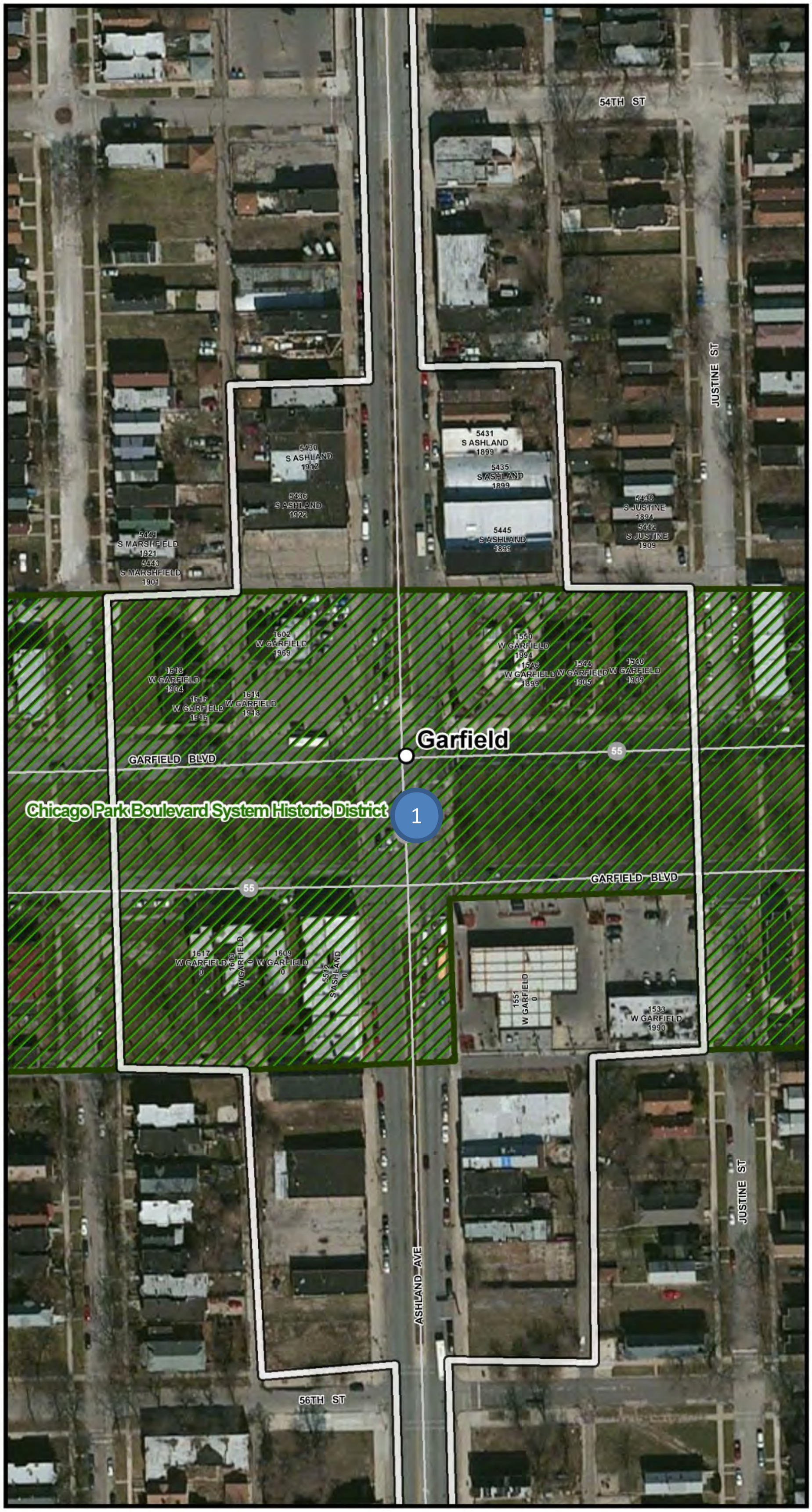
** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor

Photos:



West Garfield & South Ashland Ave

Station Area 26: Garfield Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 28: 63rd

The intersection is a typical urban environment full of activity and characterized by several early 20th century buildings as well as more modern mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

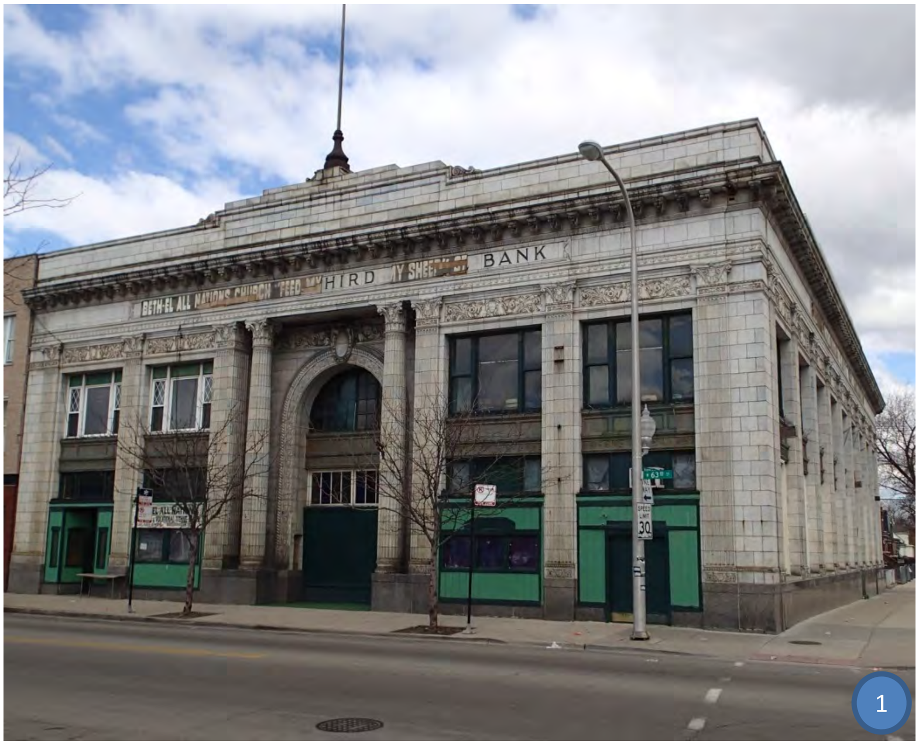
Property / Description	Date	CHRS	Landmark	NRHP
1. 1534 West 63rd Street: Classical Revival Commercial Building	1900s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

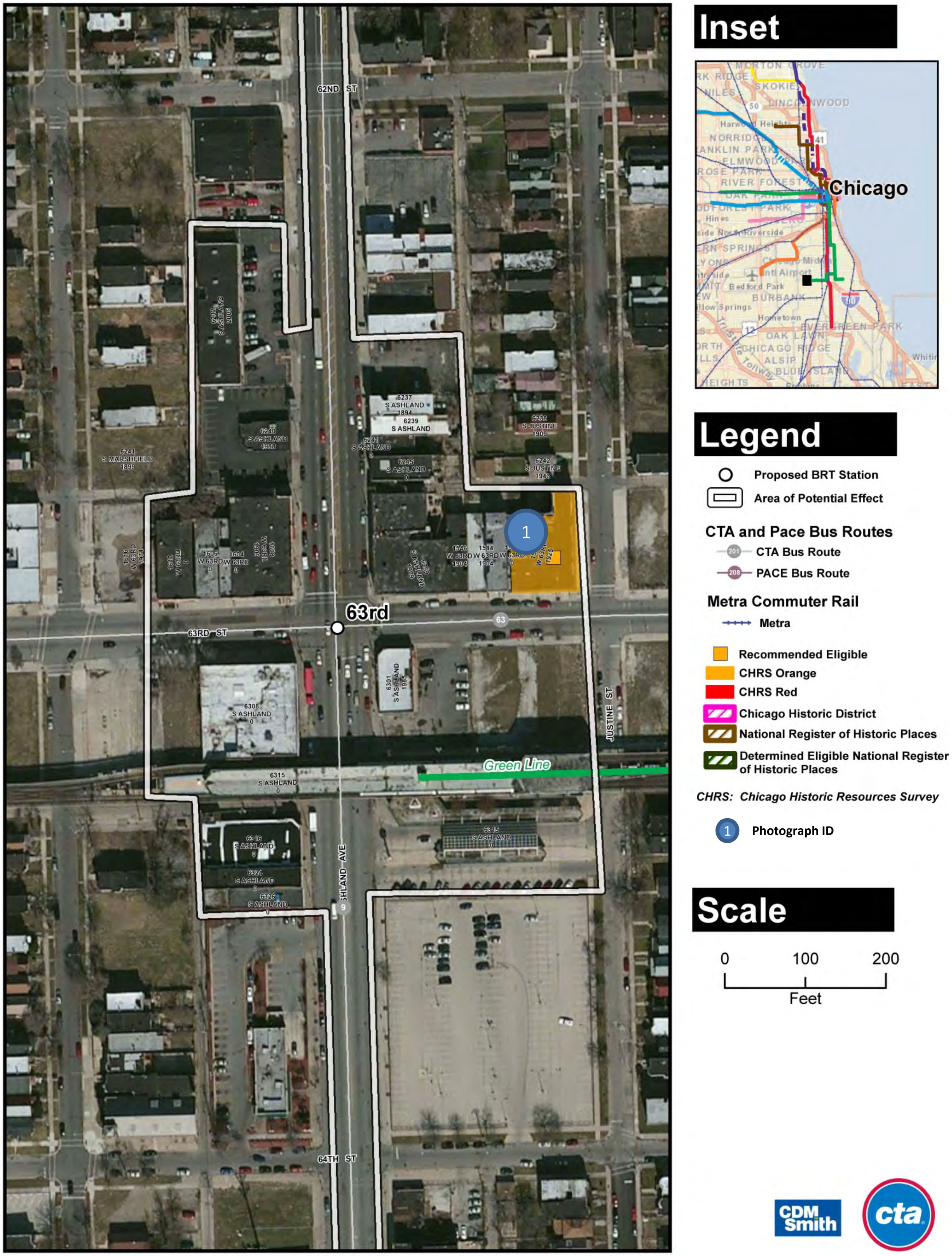
Property	No Adverse Effect
1. 1534 West 63rd Street	- Median Station north or south of 63rd St - SB Curbside Station north or south of 63rd St - NB Curbside Station north or south of 63rd St

Photos:



1534 West 63rd Street

Station Area 28: 63rd Cont’d



Station Area 31: 79th

The intersection is a typical urban environment full of activity and characterized by modern commercial buildings--a gas station and retail stores--as well as several older mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 7922 South Ashland Avenue: Art Deco/ Moderne Mixed Use Bldg.	1931	No	No	Recommended Eligible
2. 7912 South Ashland Avenue: Art Deco/ Moderne Mixed Use Bldg.	1930s	No	No	Recommended Eligible
3. 7845 South Ashland Avenue: Classical Revival Mixed Use Building	1920s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

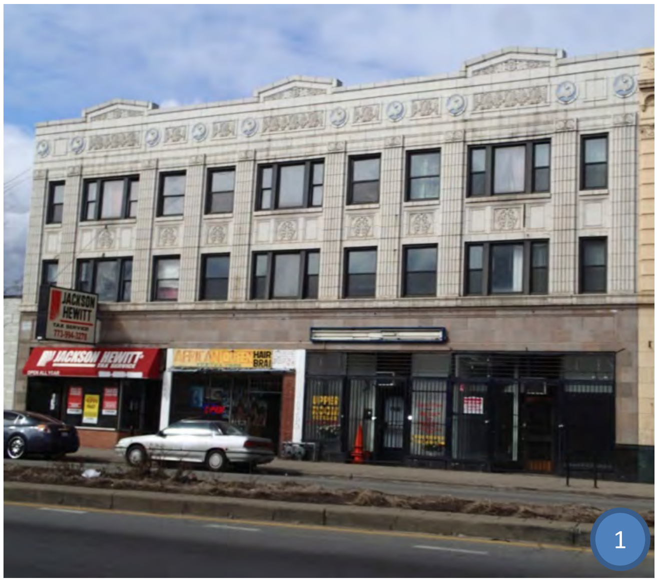
Property	No Adverse Effect
1. 7922 South Ashland Avenue	- Median Station north or south of 79th St - SB Curbside Station north or south of 79th St - NB Curbside Station north or south of 79th St
2. 7912 South Ashland Avenue	- Median Station north or south of 79th St - SB Curbside Station north of 79th St - NB Curbside Station north or south of 79th St - SB Curbside Station south of 79th St *
3. 7845 South Ashland Avenue	- Median Station north or south of 79th St - SB Curbside Station north or south of 79th St - NB Curbside Station south of 79th St - NB Curbside Station north of 79th St*
* Due to design of station being similar in size and scale to existing shelters along the corridor	

Photos:

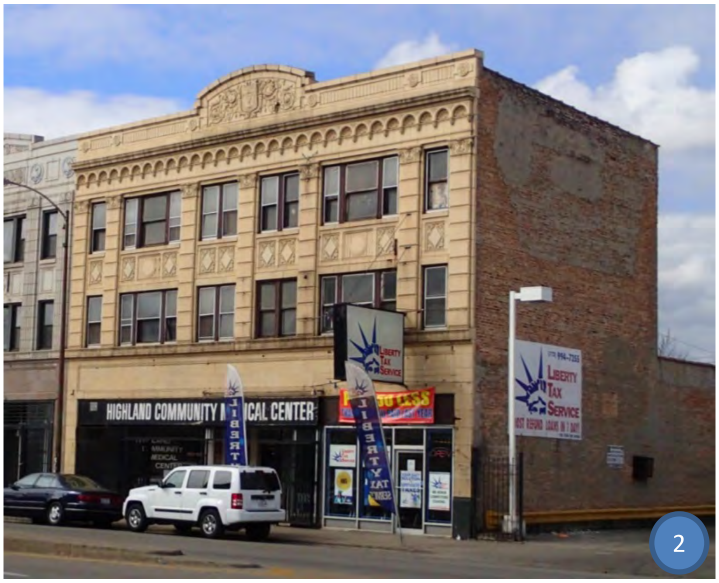
See Next Page

Station Area 31: 79th Cont'd

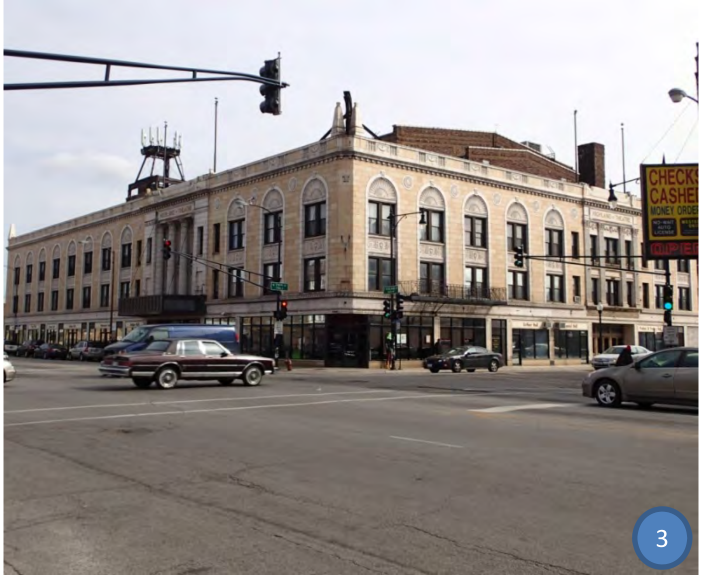
Photos:



7922 South Ashland Avenue

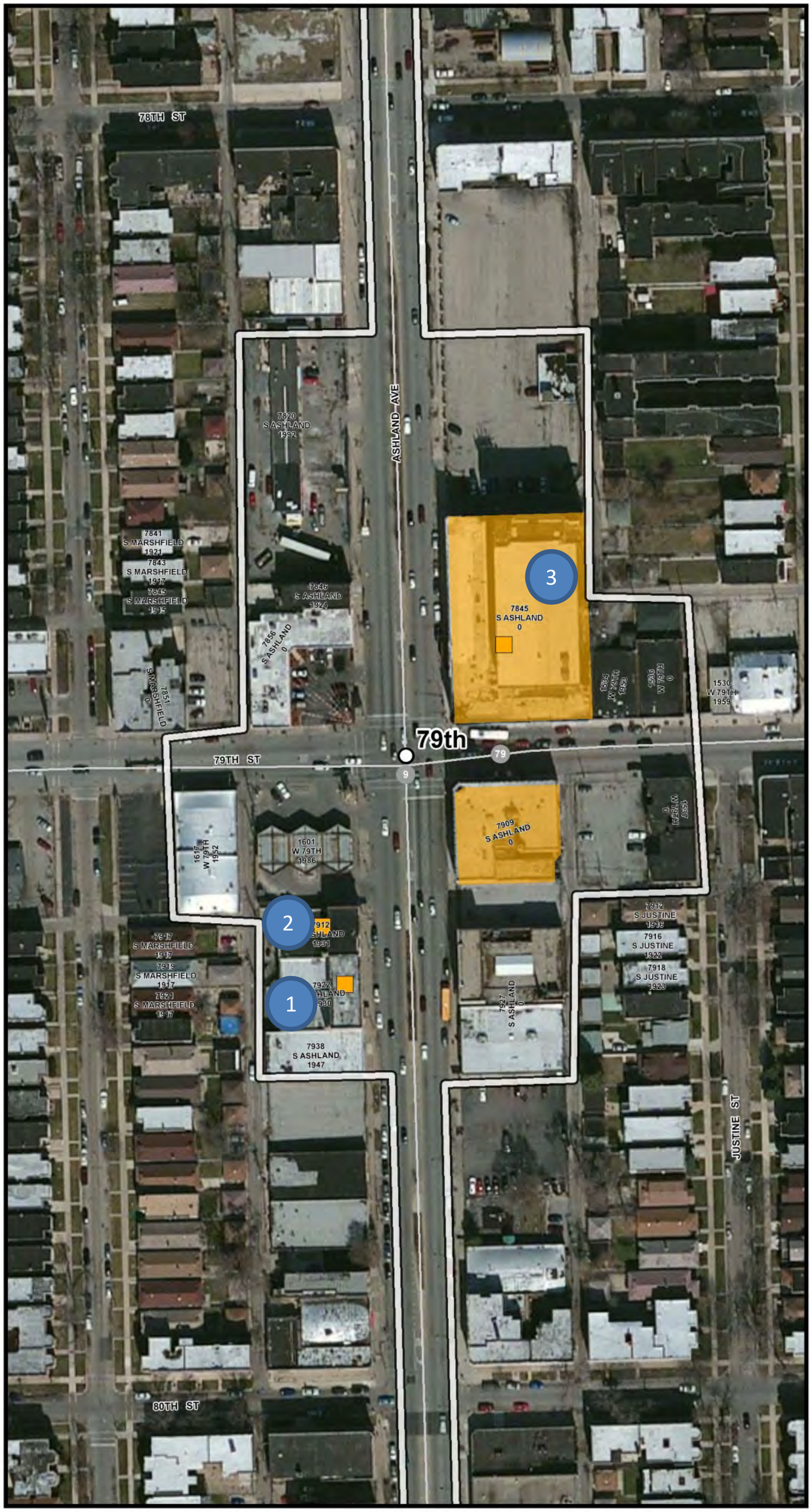


7912 South Ashland Avenue



7845 South Ashland Avenue

Station Area 31: 79th Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

- 201 CTA Bus Route
- 208 PACE Bus Route

Metra Commuter Rail

- Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 35: 95th

The intersection is a typical urban environment full of activity and characterized by modern commercial buildings along its western side including a gas station and fast food restaurant as well as several older mixed-use buildings located on the eastern side of Ashland. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

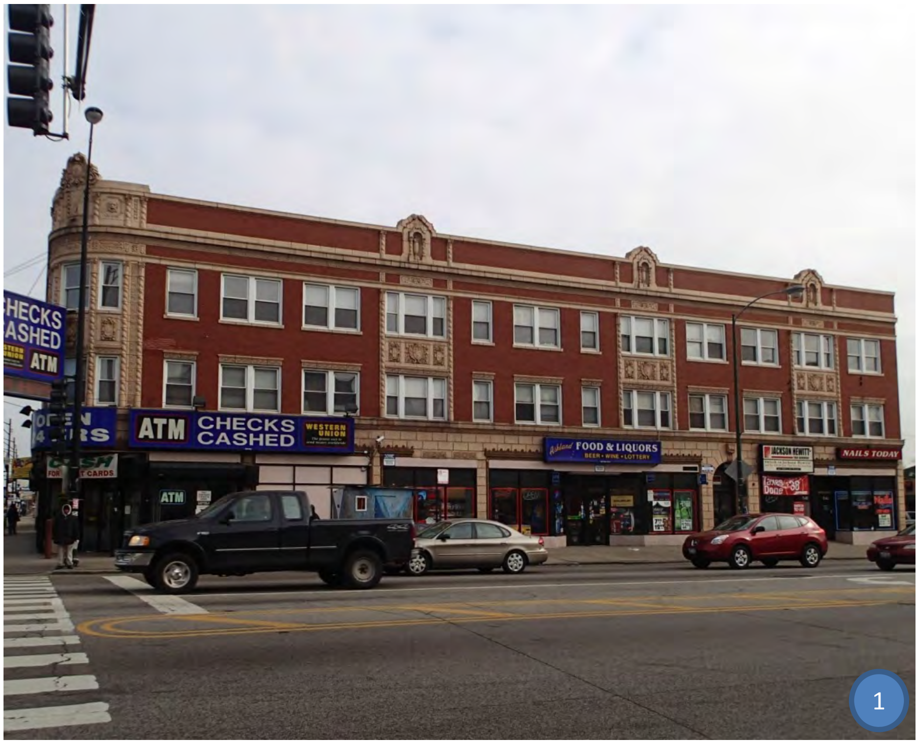
Property / Description	Date	CHRS	Landmark	NRHP
1. 9459 South Ashland Avenue: Classical Revival Mixed Use Building	1880s	No	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

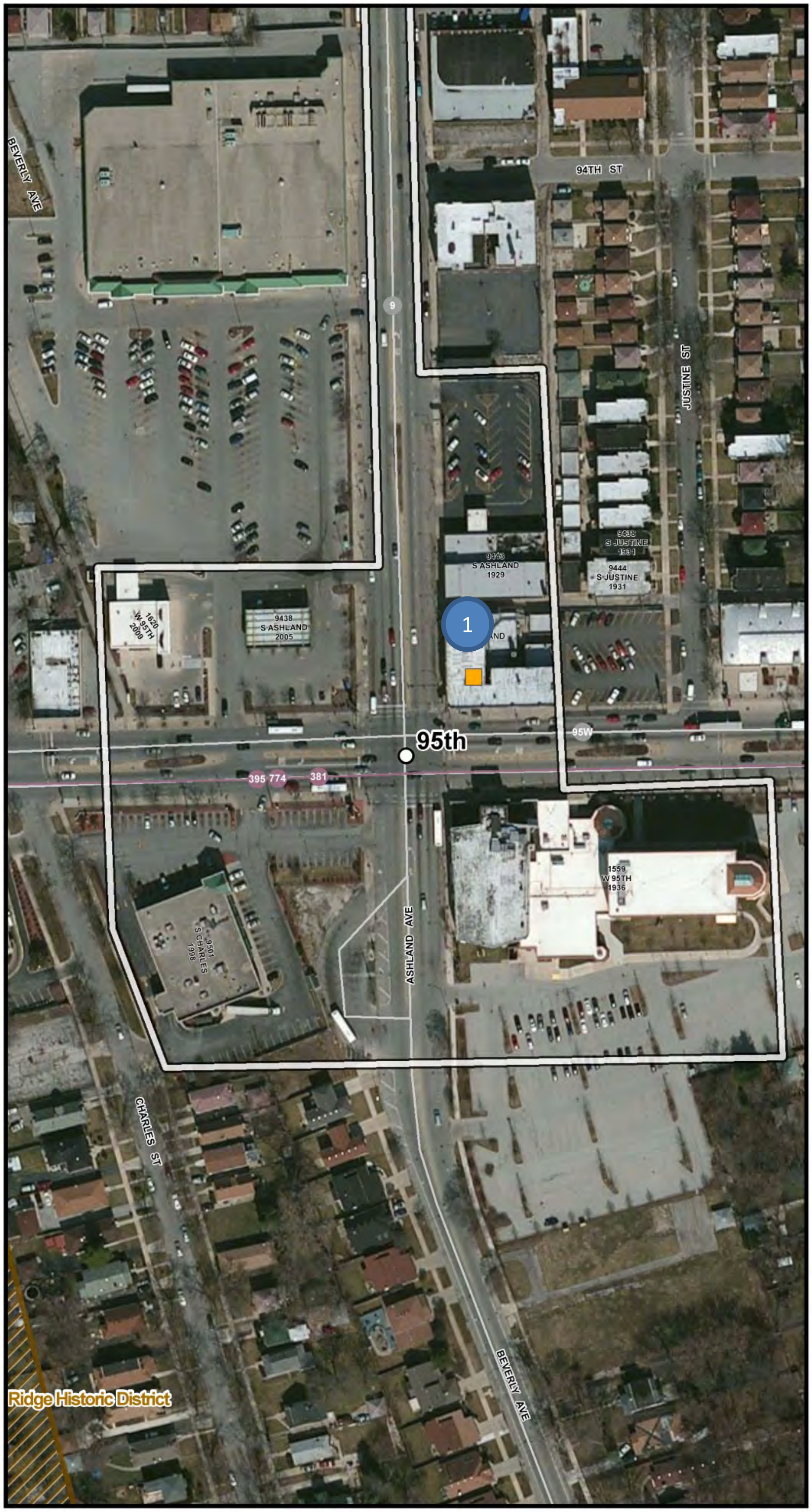
Property	No Adverse Effect
1. 9459 South Ashland Avenue	- Median Station north or south of 95th St - SB Curbside Station north or south of 95th St - NB Curbside Station south of 95th St - NB Curbside Station north of 95th St*
*** Due to design of station being similar in size and scale to existing shelters along the corridor**	

Photos:



9459 South Ashland Avenue

Station Area 35: 95th Cont'd



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Legend

- ○ Proposed BRT Station
- ▭ Area of Potential Effect

CTA and Pace Bus Routes

- 201 CTA Bus Route
- 208 PACE Bus Route

Metra Commuter Rail

- Metra

- 🟧 Recommended Eligible
- 🟧 CHRS Orange
- 🟥 CHRS Red
- ▨ Chicago Historic District
- ▨ National Register of Historic Places
- ▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

- 1 Photograph ID

Scale

0 100 200
Feet

Between Station Area: North Ashland Avenue

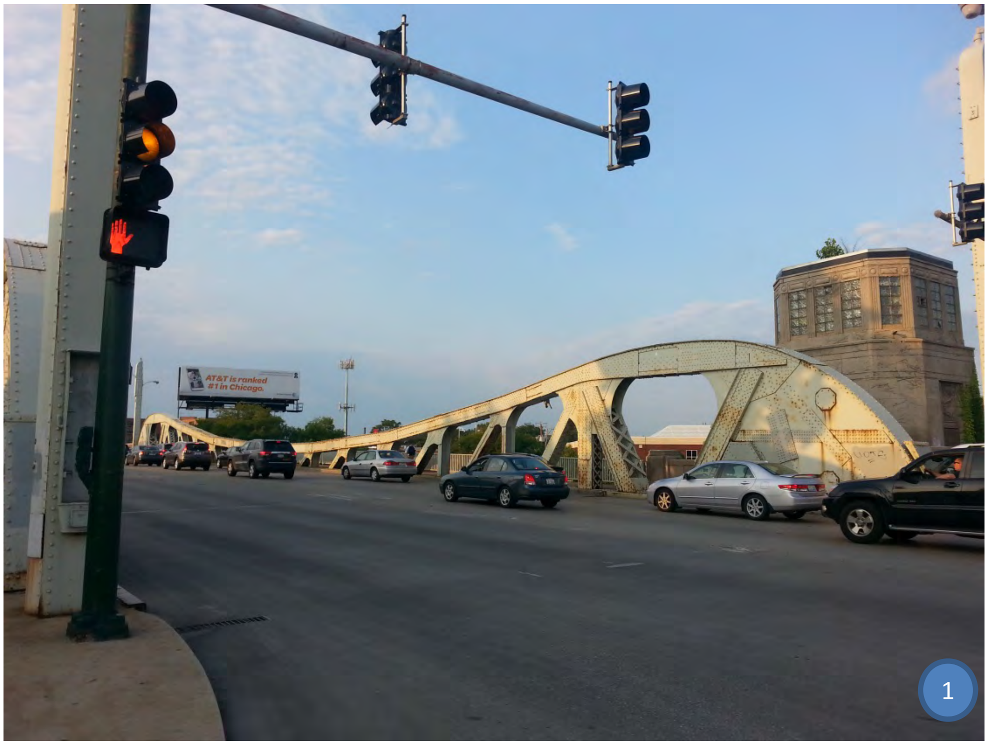
The location is a typical urban environment full of activity and characterized by modern commercial buildings as well as parking lots and industrial areas. The following NRHP historic resources were identified within this area:

Property / Description	Date	CHRS	Landmark	NRHP
1. North Ashland Avenue Bridge: Art Deco	1936	No	No	Recommended Eligible

Effects Assessment:

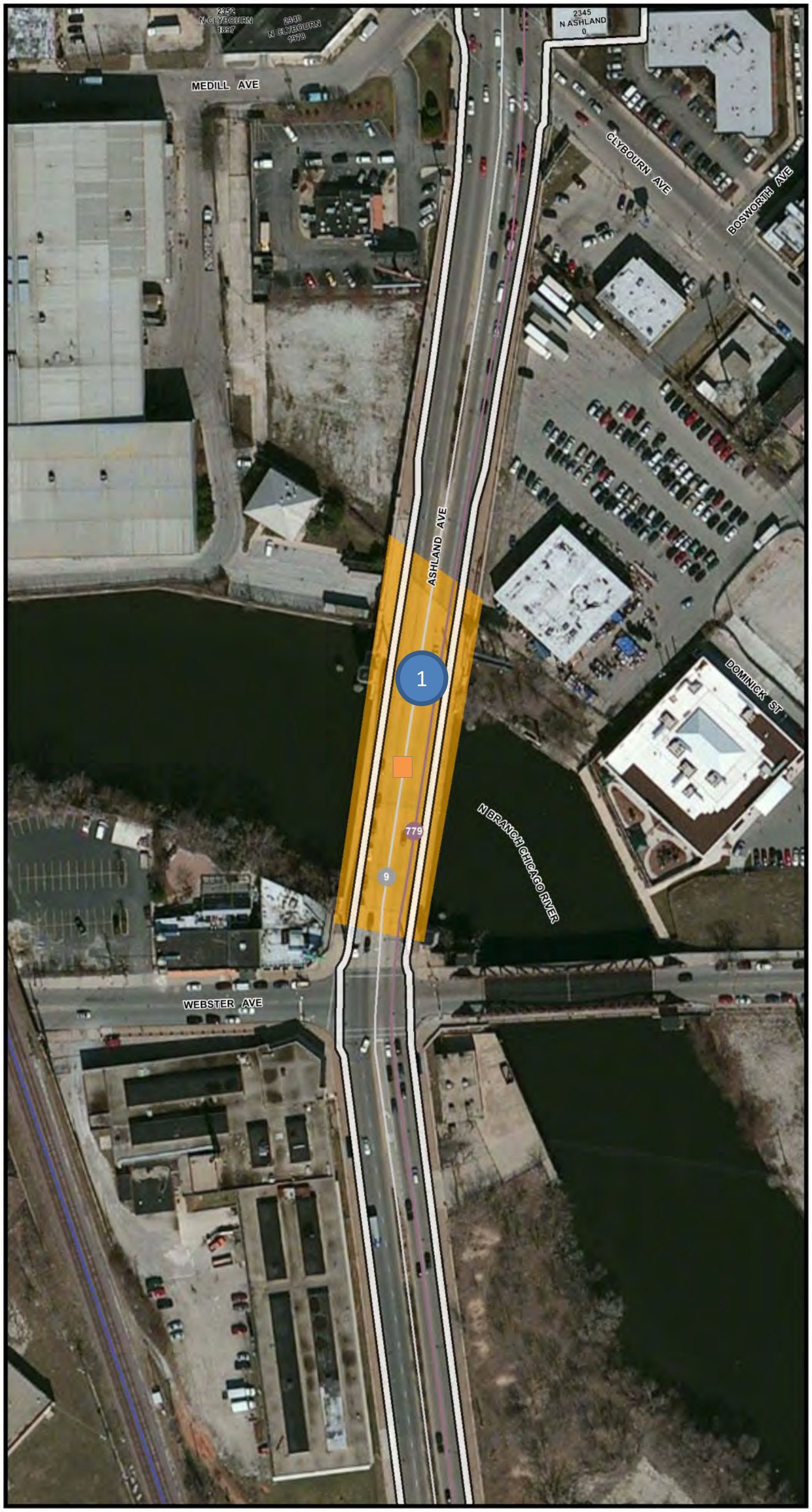
For each recommended eligible and listed resource; potential effects were examined to see if they would occur based on the proposed project . As no station is proposed in this location and project activities would be limited to the milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements, there would ne no adverse effect on this resource.

Photos:



North Ashland Avenue Bridge

Between Station Area: North Ashland Avenue



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Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

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Metra Commuter Rail

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🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

1 Photograph ID

Scale

0 100 200

Feet

Appendix E-4: Noise Technical Memorandum

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *August 8, 2013*

Subject: *Noise*

Prepared by: CDM Smith, Inc.

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and the Federal Transit Authority (FTA), is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue Bus Rapid Transit (BRT) Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

- Construction of 35 median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

Purpose

This memorandum presents the noise analysis conducted for the proposed project. The sections that follow include a description of noise fundamentals, noise impact criteria, and the noise analysis results.

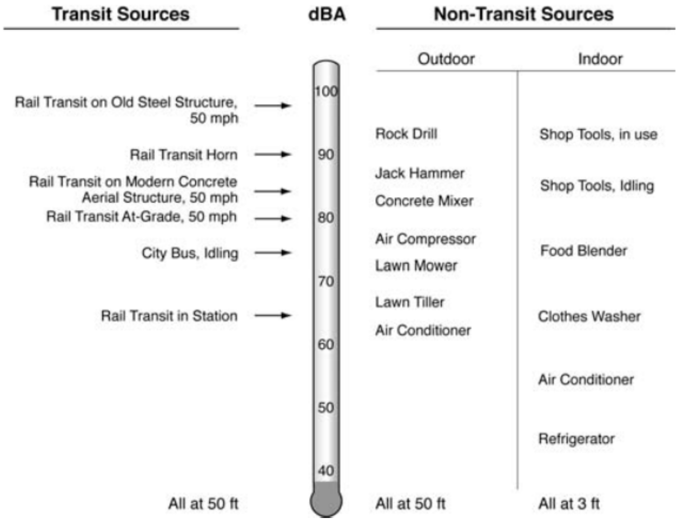
Noise Fundamentals

Noise is “any sound that is undesired or interferes with a person’s hearing of something”.[1] Noise or sound is a pressure on the ear drum and that is measured on a scale from one to one billion. To simplify this scale, engineers and scientists have established a decibel scale (dB) of 1 to 180 through a mathematical process called a logarithm, which is easier to use. The human ear can only hear certain frequencies of noise, so, in order to show only the level or frequencies that can be heard by the human ear, the scale is given an A-weighting, designated by dBA. The scale of 1 to 180 dBA provides a range for the sound levels that fall within a human’s normal range of hearing for various types of noises. **Figure 1** provides an overview of several different types of noises and what the sound level is in dBA. The scale provides a better representation of the actual sound levels and how a person would be affected. Traffic noise, defined as unwanted sound, is associated with highway/transit projects and is usually in form of loud or persistent noises from cars, trucks, and buses. Traffic noises are generated from engines, mufflers, and from tire contact with the roadway.

Noises affect people differently due to their environment and other various factors. Loud noises such as a car honking its horn would bother most people while they were trying to sleep, while a softer noise during the day might bother certain individuals if they were trying to study or concentrate on a difficult task. The FTA has developed Noise Impact Criteria for transit projects to determine when impacts occur as shown in **Figure 2**.

Noise impacts are based on comparing existing outdoor noises levels with future noise levels of proposed transit type projects. This analysis includes the consideration of absolute noise levels and the increase over existing levels in order to determine the severity of the impact caused by the project. An increase of 3 dB(A) is barely perceptible, an increase of 5 dBA is noticeable, and that a

Figure 1: Typical Noise Levels



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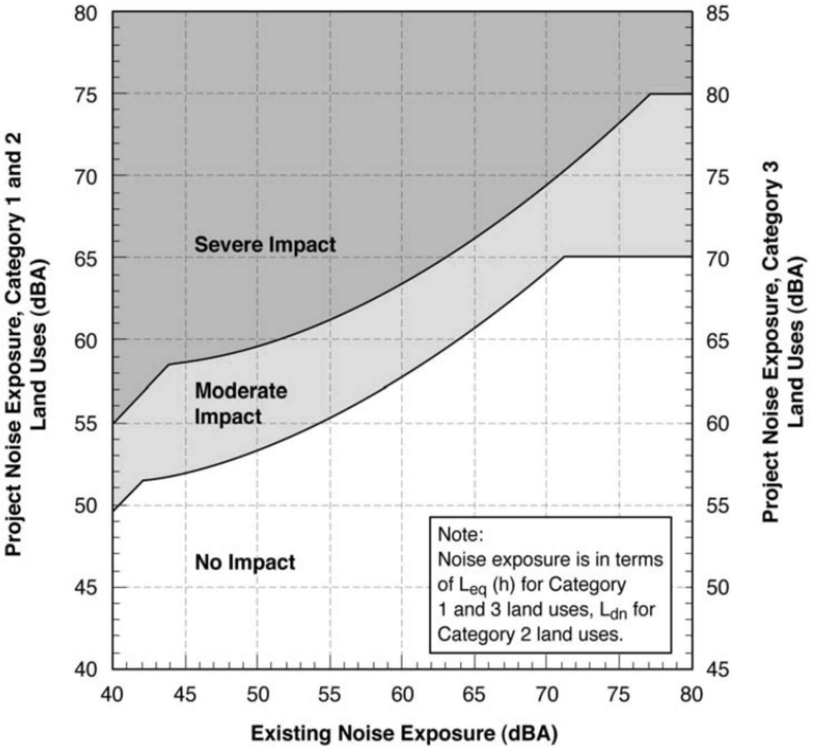
[1] Webster’s New Collegiate Dictionary, 1975. G&C Merriam Company. Springfield, Massachusetts.

Figure 2: Noise Impact Criteria Thresholds



Source: Transit Noise and Vibration Impact Assessment, May 2006

10 dB(A) increase would be perceived by someone to be a doubling of the noise level (loudness). Increases of 5-10 dB(A) would tend to be noticeable to most but not substantial. An increase of 10 dB(A) or more would be perceived by most as a substantial impact.

Land use types are also used in the determining the level and types of impacts and are grouped into three categories (1, 2, and 3), as shown in **Table 1**. These categories were developed to help in determining what dBA levels of noise would disturb people during various activities and at various locations. When dBA levels reach the point that it creates a disruption for an activity, it is considered an impact.

Table 1: Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor Leq(h)*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor Ldn	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor Leq(h)*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

* Leq for the noisiest hour of transit-related activity during hours of noise sensitivity.

Source: Transit Noise and Vibration Impact Assessment, May 2006

Noise Assessment

The FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2006) has three levels of analysis that may be used to evaluate noise impacts of a transit project, depending on the type and scale of the project, the stage of project development, and the environmental setting. The three levels of analysis are:

- Screening procedure
- General assessment
- Detailed analysis

A noise screening procedure was first performed for the project study area. This analysis was completed in accordance with the FTA procedures outlined in the *Transit Noise and Vibration Impact Assessment Manual*. The screening procedure is used to identify noise and vibration-sensitive land uses in the vicinity of a project and whether there is likely to be an impact. The screening procedure takes into account the noise impact criteria, the type of project, and noise-sensitive land uses.

The screening procedure for a bus way was deemed most appropriate for this noise analysis. The screening procedure provides an impact distance, which is the distance from the centerline of the BRT project where noise sensitive receptors would be impacted, which is far enough out to include all probable noise impacted locations. This distance is calculated using a worst case scenario for the proposed bus way project with a low threshold of 50 dBA as the impact criteria. Based on FTA's guidelines, the screening distances, which are prescribed distances for the noise analysis, for a bus way system is 500 feet (unobstructed) and 250 feet (intervening buildings).

Land uses within the screening distances were reviewed to determine the category types to be analyzed as they correspond with **Table 1**. Land use maps of the corridor are provided in **Attachment A**. The category types associated with this project are primarily Land Use Category "2". Industrial and commercial land uses are also within the project area; however, noise impact criteria do not apply to industrial or commercial land uses due to their higher noise level activities.

In order to analyze and compare specific categories of noise impacts associated with the Build Alternative, two noise assessment buffers at 500 feet and 250 feet from the centerline of the bus way facility (center of the noise-generating activity) were developed. The existing noise environment was assumed to be 60 dBA based on the *FTA Transit Noise and Vibration Impact Assessment Manual (Figure 2-17)*. Based on the screening analysis, land uses included in the residential land use category were found to be located within the noise buffers. Therefore, a general assessment was conducted to determine the noise levels using the FTA's Noise Impact Assessment Spreadsheet (see **Attachment B**). The average number of buses per hour was assumed to be 12 buses in each direction for the daytime as well as nighttime hours traveling at 15.9 miles per hour.

The proposed project would be located along an existing roadway corridor, in an urban setting, and would not be substantially increasing the number of transit vehicles on the roadway. **Table 4** shows the noise levels at 50, 100, 150, 200 feet from the proposed alignment measured from center of noise generating activity.

Table 4: Noise Level Impact Summary

Distance	Project Ldn	Existing Ldn	Moderate Impact Criteria	Severe Impact Criteria	Impact
50 ft	59 dBA	56 dBA	58 dBA	63 dBA	Moderate Impact
100 ft	55 dBA	52 dBA	58 dBA	63 dBA	No
150 ft	52 dBA	49 dBA	58 dBA	63 dBA	No
200 ft	50 dBA	47 dBA	58 dBA	63 dBA	No

At 50 feet from the Ashland Avenue alignment, the increase in noise level is expected to be 3 dBA and the receivers would meet the Moderate Impact Criteria of 58 dB(A). The contour distance to moderate impact is 62 feet and for severe impact is 26 feet from the center of noise generating activity.

Environmental Impacts

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed and no impacts to current noise levels would occur.

Ashland Avenue BRT Project

The Ashland Avenue BRT Project would have no direct impacts on land uses in the corridor and is consistent with existing land use, zoning and relevant community land use plans. The City of Chicago is committed to the proposed effort and additional land use studies are proposed to identify further improvements to land use policies in the corridor to support development of the proposed project. In addition, the implementation of BRT would further support economic development plans by proving greater cohesion between land use and transportation. The BRT service and street enhancements could incentivize new transit oriented development (TOD) in the corridor, which would be consistent with zoning.

Based on the anticipated frequency and speed of the proposed BRT service, the proposed project is not expected to result in any severe noise impacts to the project area within the existing right-of-way. Receivers within 62 feet from the Ashland Avenue alignment measured from center of noise generating activity would experience a moderate impact, or a 3 dBA increase. An increase of 3 dBA is barely perceptible change and is not expected to create disruption of normal activities. Also, noise levels are expected to be lower with the re-designation of one travel lane in each direction as a center running, dedicated bus lane. The overall traffic volume within the Ashland Avenue corridor is expected to be reduced by 35 percent with implementation of the proposed project. Roadway noise is the predominant noise influence in the area and the additional contribution from BRT traffic would be relatively minor. As indicated in **Chapter 3 of the Environmental Assessment**, diverted traffic will be absorbed throughout the robust, Chicago road network and no other notable increases to noise are anticipated on any one roadway within the network absorbing this traffic diversion.

Construction Noise

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed and no impacts to current noise levels during construction would occur.

Ashland Avenue BRT Project

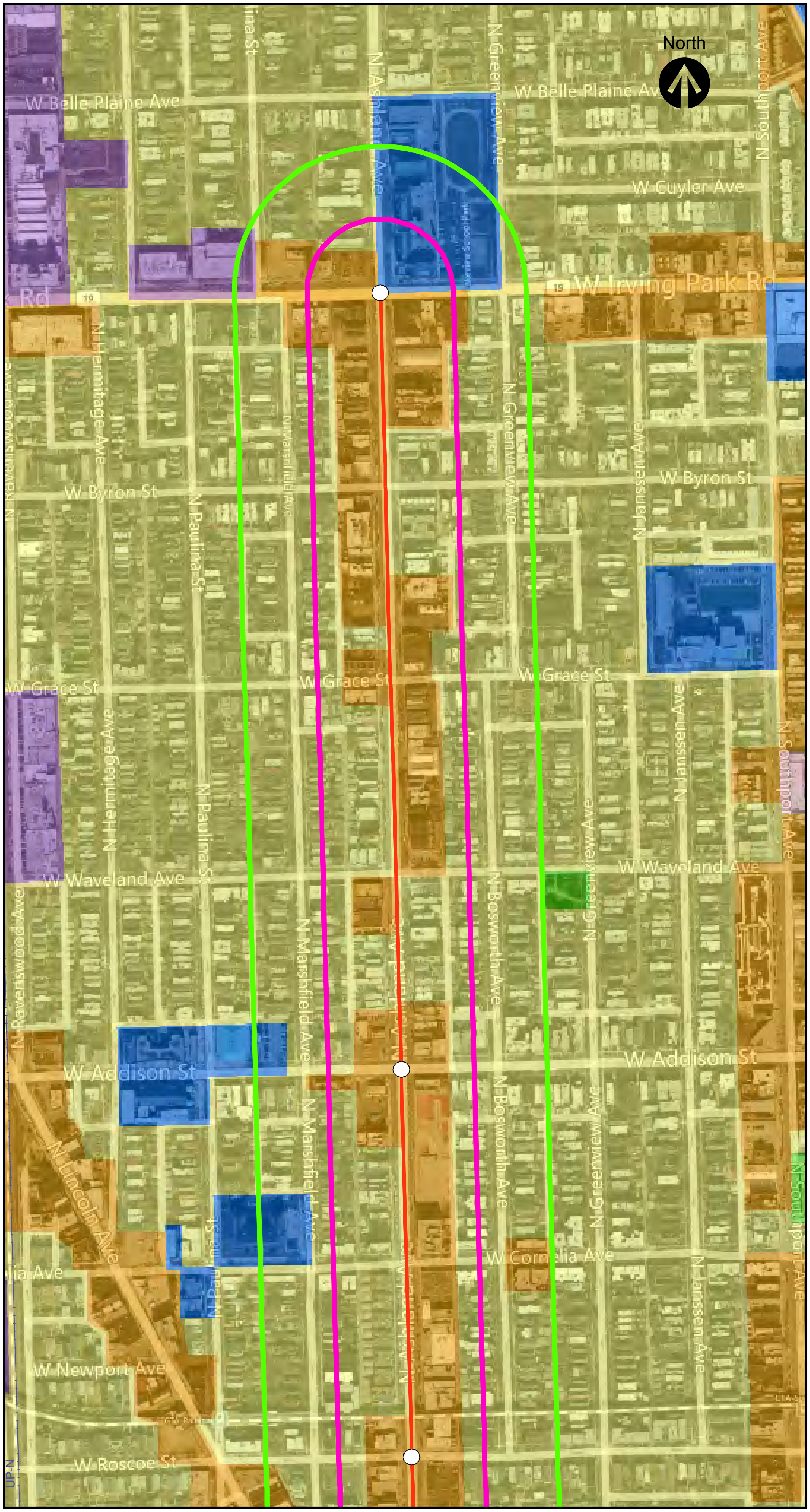
The major construction activities of this project are expected to be earth removal, hauling, grading, and paving. Generally construction noise impacts, such as temporary speech interference for passersby and individuals living or working near the project, can be expected. In some areas, construction noise impacts can be expected to be greater due to the close proximity of existing housing. However, considering the relatively short term nature of construction noise, these impacts are not expected to be substantial. The contractor can limit times for which certain types of construction operations may be undertaken. This would assist in minimizing impacts to sensitive receptors in the project vicinity.

References

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment, Department of Transportation, Federal Transit Administration, Report No. FTA-VA-90-1003-06, 10 May 2006. Available at: http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf . Accessed: May 17, 2013.

Attachment A

Land Use Maps



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Legend

Land Use

○ Proposed BRT Station

— Proposed BRT Route

⬭ 250 Ft Buffer

⬭ 500 Ft Buffer

🟨 Residential

🟥 Retail Service

🟪 Office Professional

🟧 Urban Mix

▨ Other Commercial

🟦 Institutional

🟪 Industrial, Warehousing, and Utilities; Open Space

⬜ Transportation, Communications, and Utilities

🟩 Open Space

⬛ Vacant or Under Construction

⬜ Water

Data source:
Cook County Assessor

Scale

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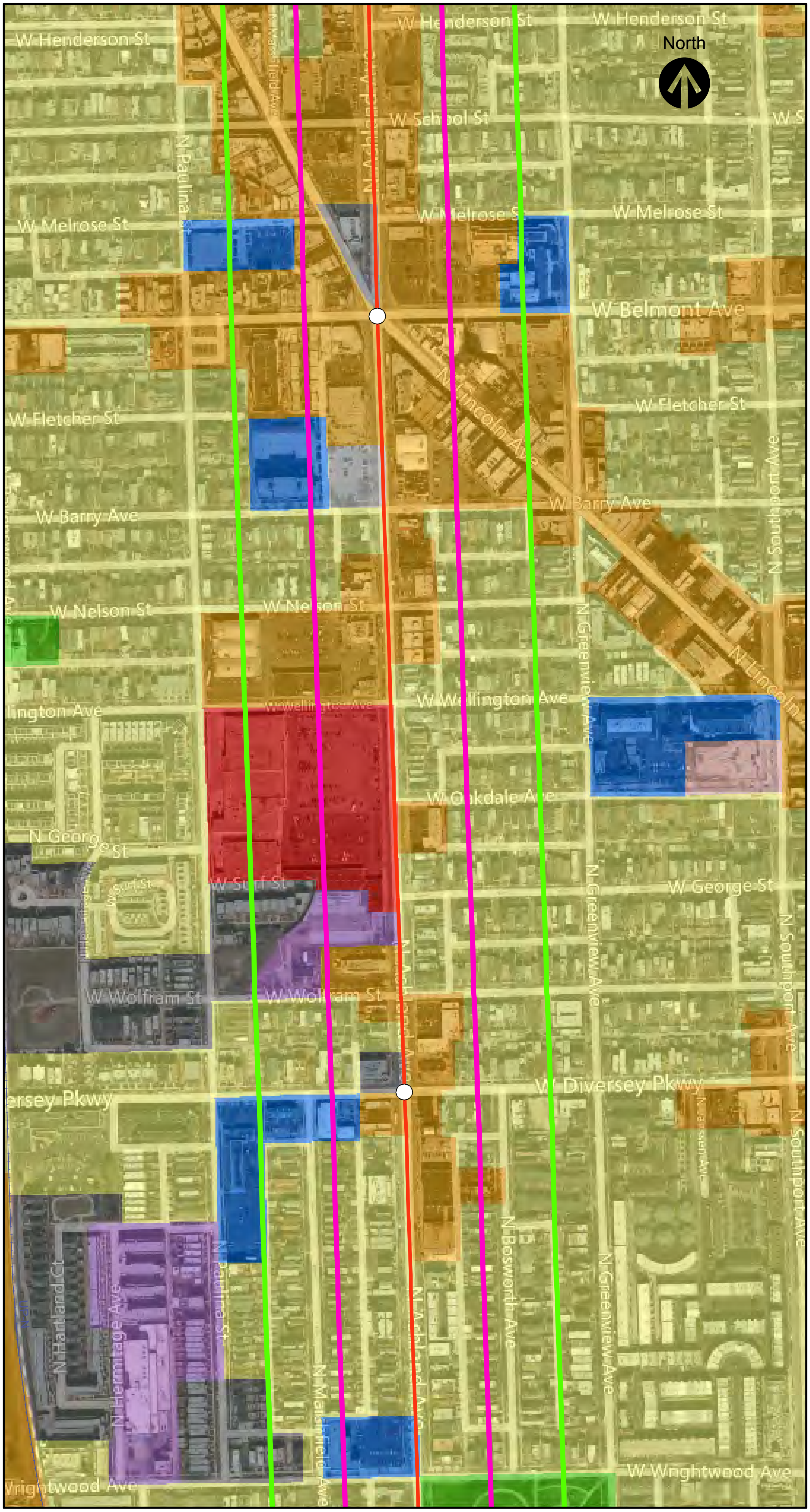

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Legend

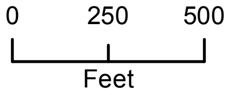
Land Use

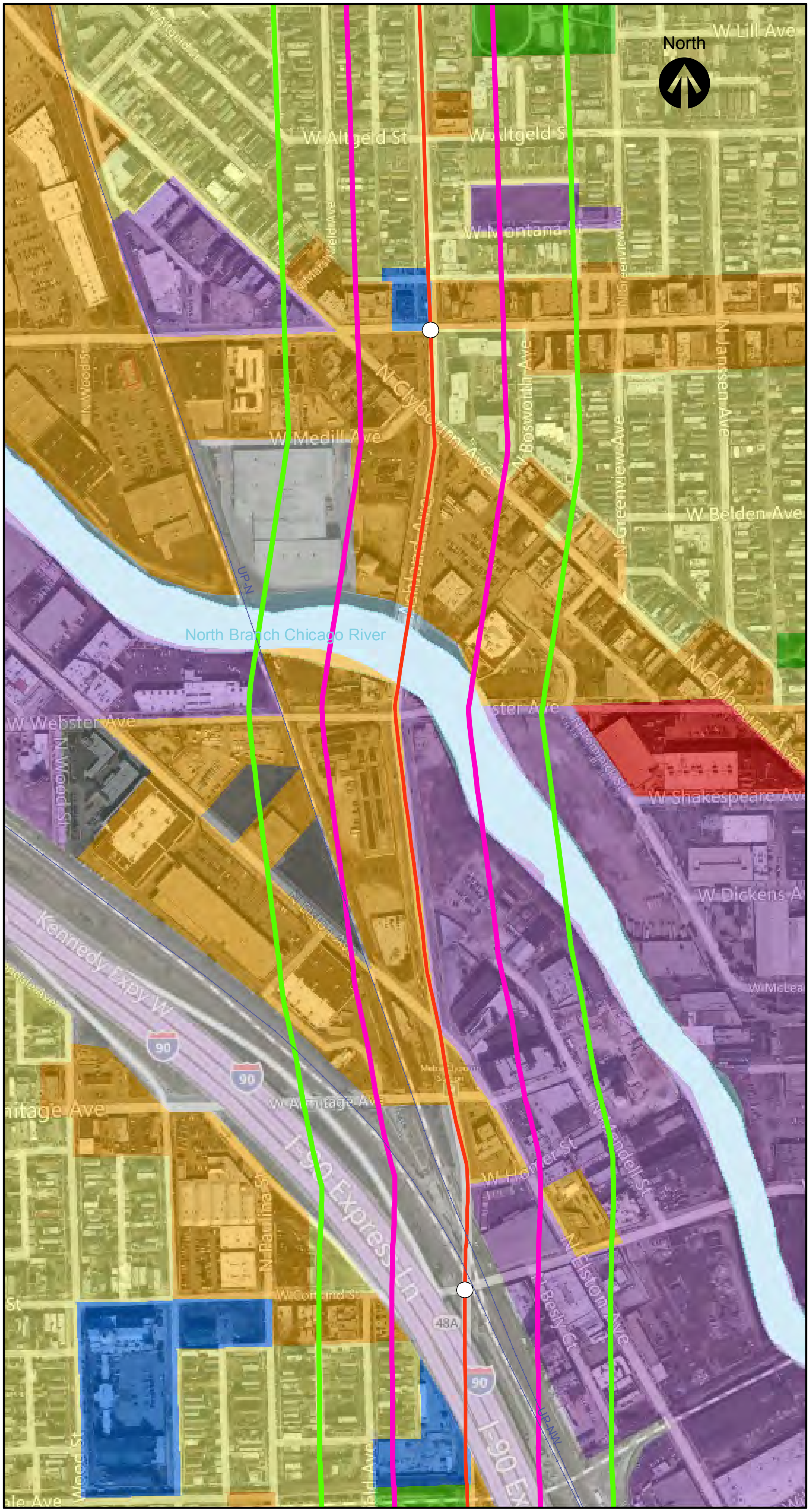
- ○ Proposed BRT Station
- — Proposed BRT Route
- ○ 250 Ft Buffer
- ○ 500 Ft Buffer
- ■ Residential
- ■ Retail Service
- ■ Office Professional
- ■ Urban Mix
- ■ Other Commercial
- ■ Institutional
- ■ Industrial, Warehousing, and Utilities; Open Space
- ■ Transportation, Communications, and Utilities
- ■ Open Space
- ■ Vacant or Under Construction
- ■ Water

Data source:

Cook County Assessor

Scale





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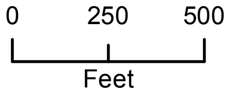
Legend

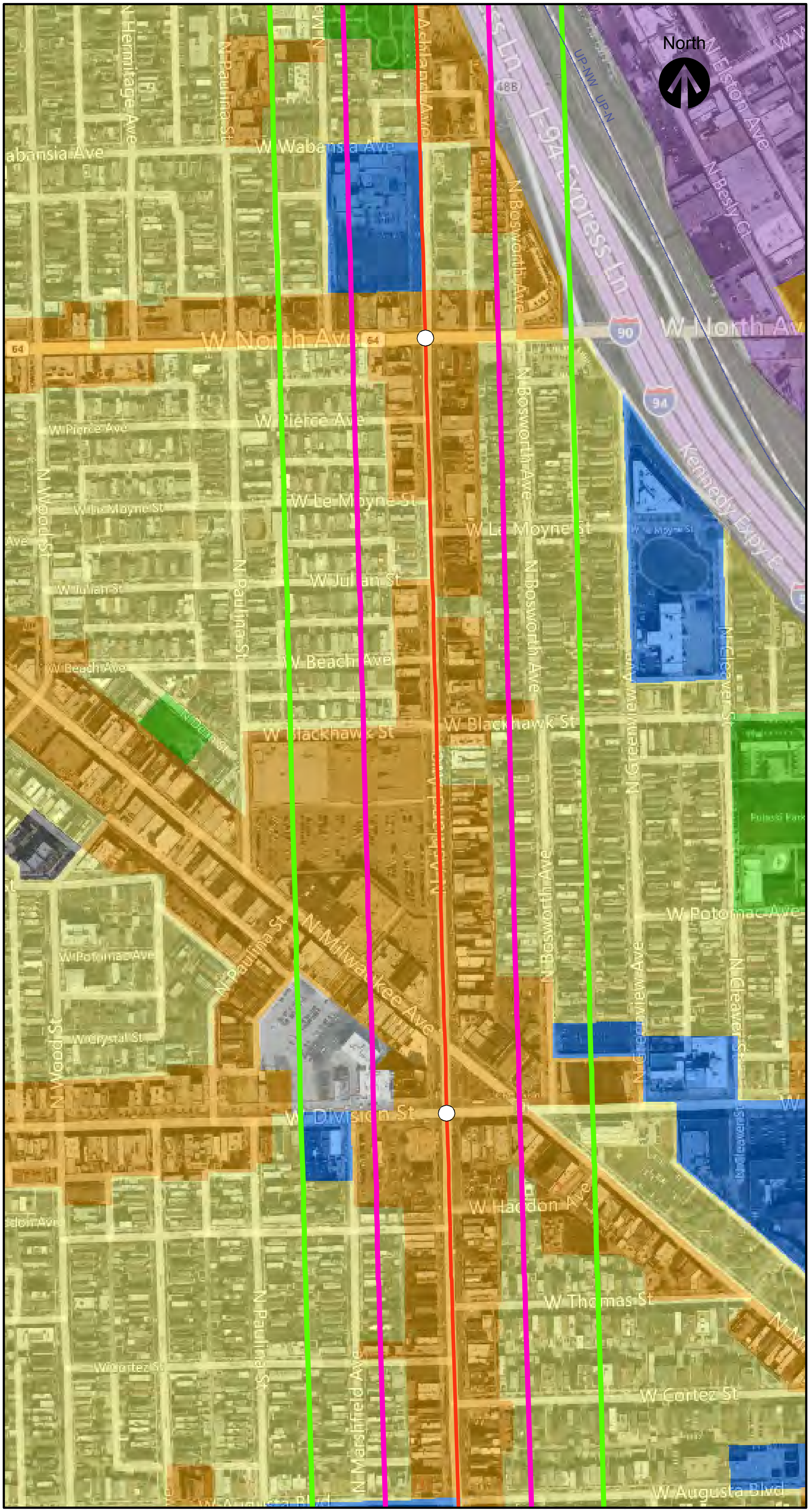
Land Use

○ Proposed BRT Station
▬ Proposed BRT Route
○ 250 Ft Buffer
○ 500 Ft Buffer
■ Residential
■ Retail Service
■ Office Professional
■ Urban Mix
■ Other Commercial
■ Institutional
■ Industrial, Warehousing, and Utilities; Open Space
■ Transportation, Communications, and Utilities
■ Open Space
■ Vacant or Under Construction
■ Water

Data source:
Cook County Assessor

Scale





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Legend

Land Use

○ Proposed BRT Station

— Proposed BRT Route

⬭ 250 Ft Buffer

⬭ 500 Ft Buffer

🟨 Residential

🟥 Retail Service

▨ Office Professional

🟧 Urban Mix

▨ Other Commercial

🟦 Institutional

🟪 Industrial, Warehousing, and Utilities; Open Space

▨ Transportation, Communications, and Utilities

🟩 Open Space

⬜ Vacant or Under Construction

▨ Water

Data source:
Cook County Assessor

Scale

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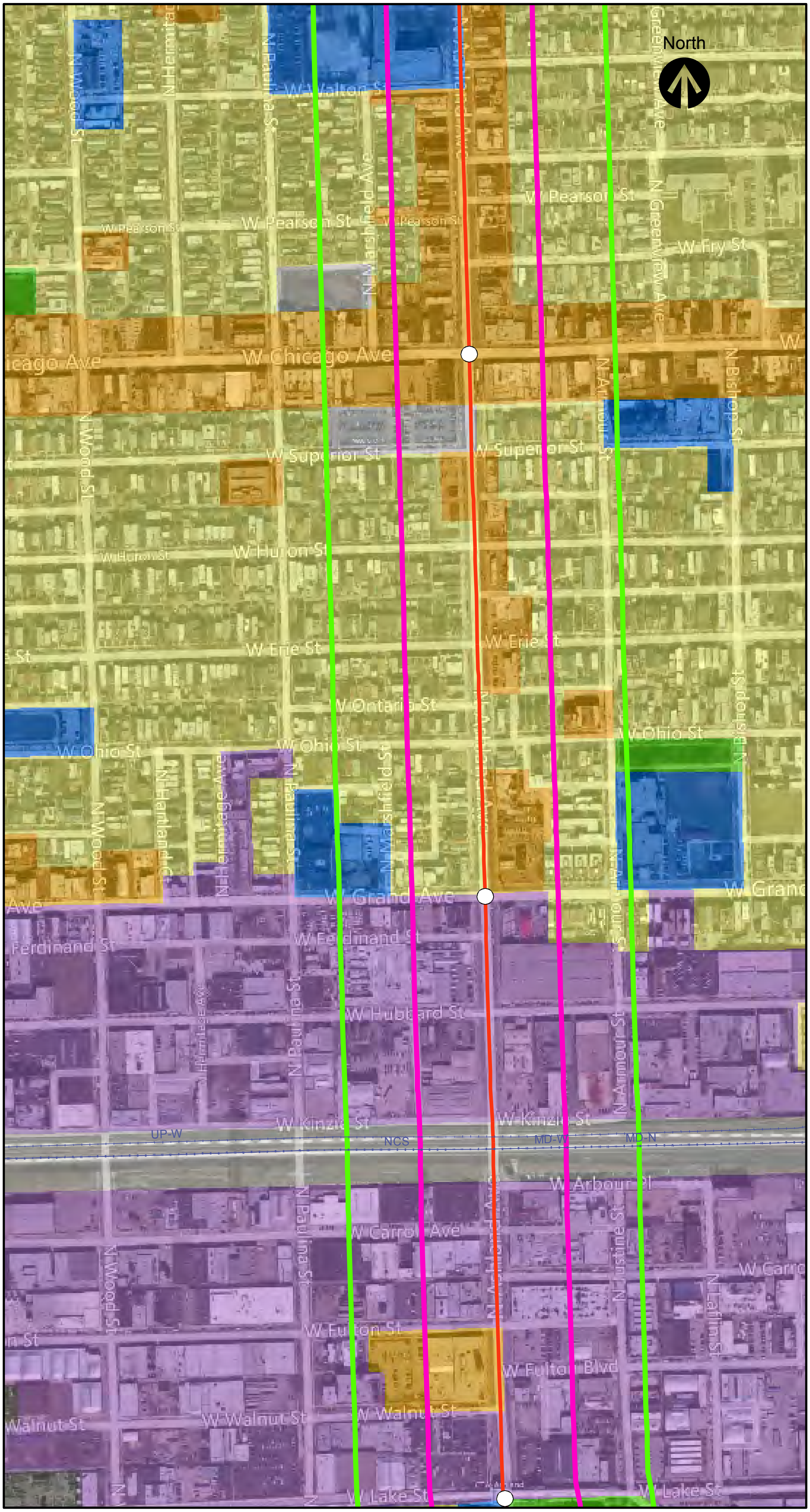

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Legend

Land Use

○ Proposed BRT Station

— Proposed BRT Route

⬭ 250 Ft Buffer

⬭ 500 Ft Buffer

■ Residential

■ Retail/Service

■ Office/Professional

■ Urban Mix

■ Other Commercial

■ Institutional

■ Industrial, Warehousing, and Utilities; Open Space

■ Transportation, Communications, and Utilities

■ Open Space

■ Vacant or Under Construction

■ Water

Data source:
Cook County Assessor

Scale

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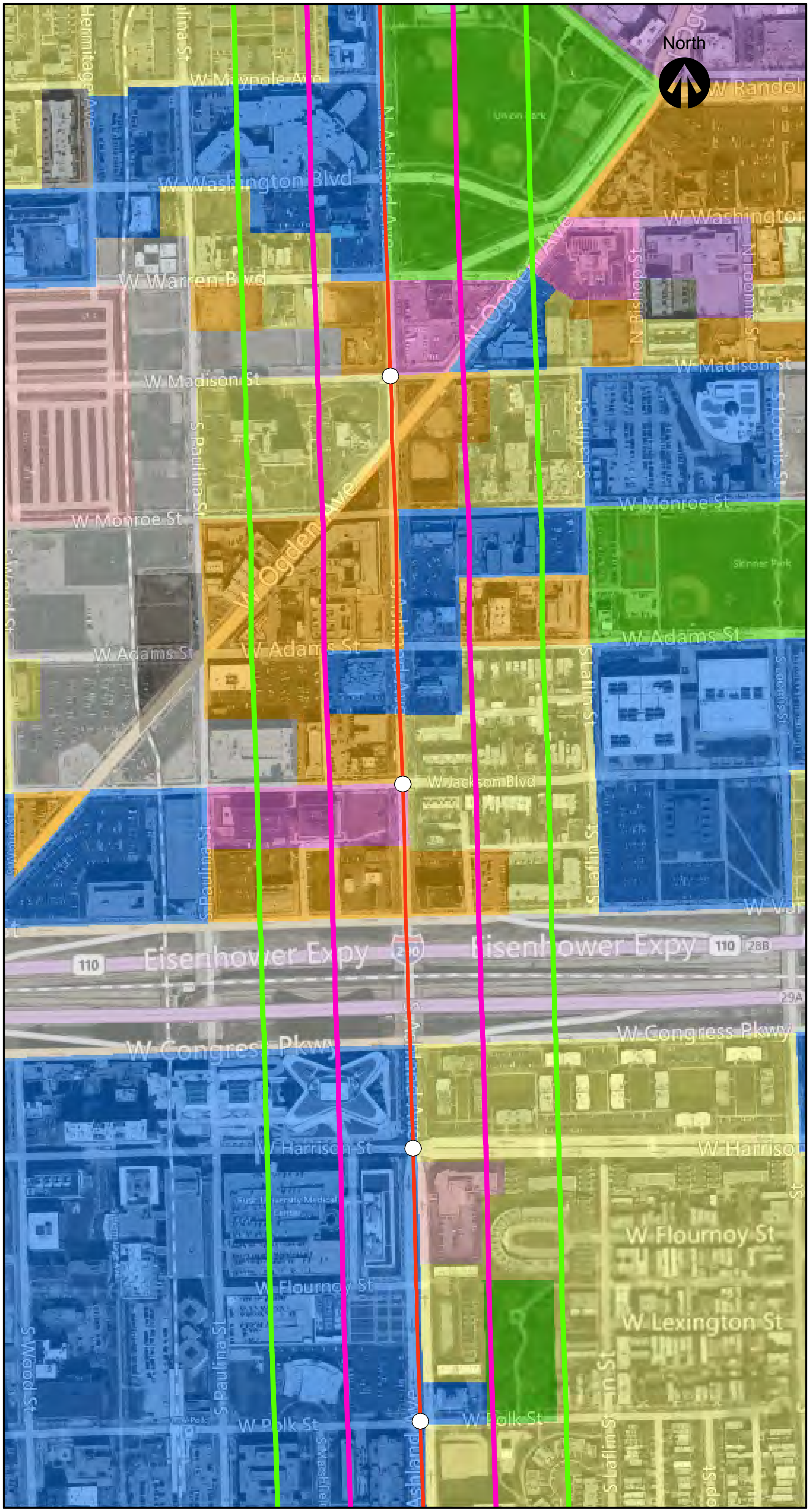

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Legend

Land Use

○ Proposed BRT Station

— Proposed BRT Route

⬭ 250 Ft Buffer

⬭ 500 Ft Buffer

🟨 Residential

🟥 Retail Service

🟪 Office Professional

🟧 Urban Mix

▨ Other Commercial

🟦 Institutional

🟪 Industrial, Warehousing, and Utilities; Open Space

⬜ Transportation, Communications, and Utilities

🟩 Open Space

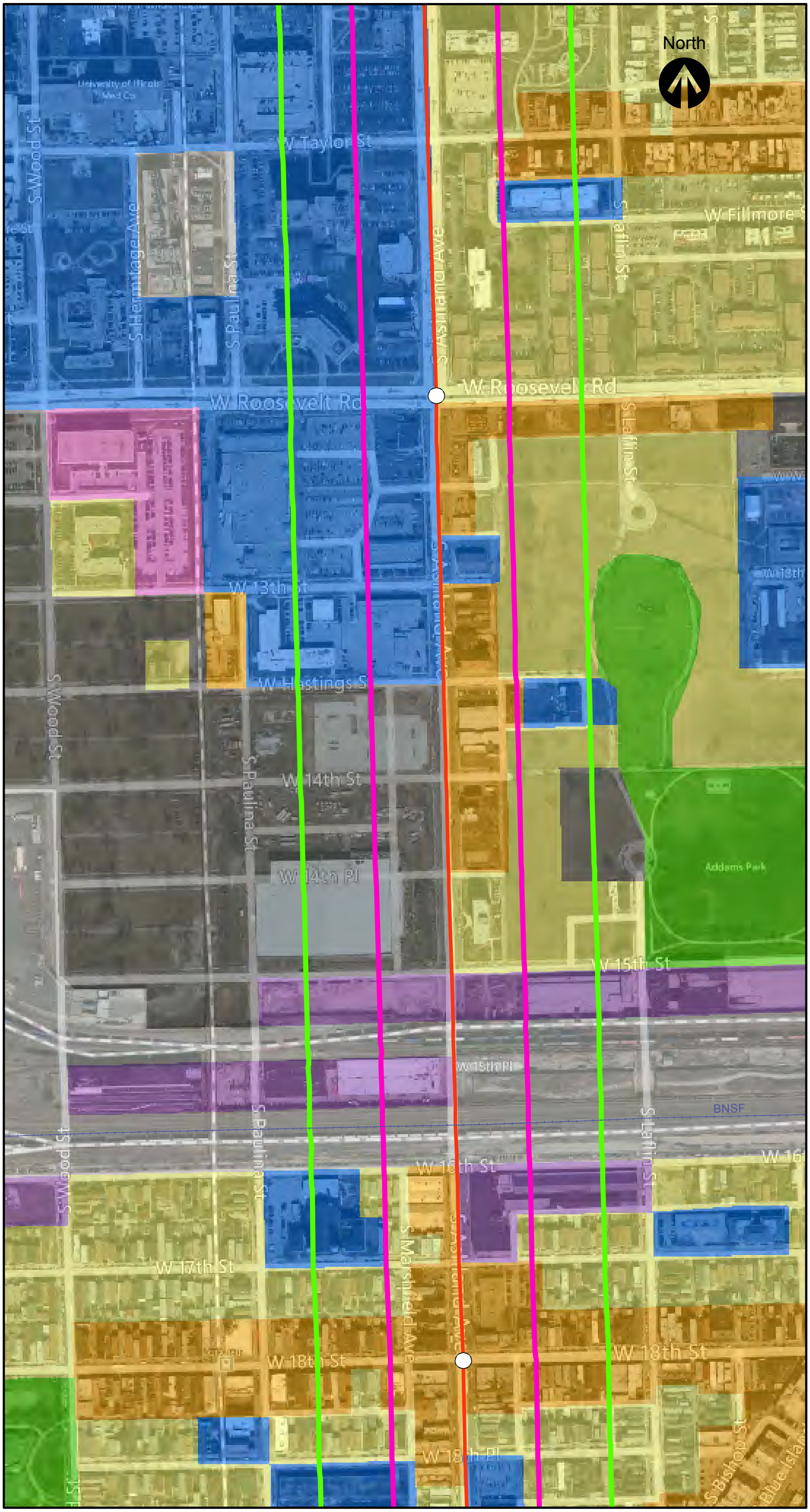
⬛ Vacant or Under Construction

⬜ Water

Data source:
Cook County Assessor

Scale

0 250 500
Feet



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Legend

Land Use

○ Proposed BRT Station

▬ Proposed BRT Route

⭕ 250 Ft Buffer

⭕ 500 Ft Buffer

🟨 Residential

🟥 Retail Service

🟪 Office Professional

🟧 Urban Mix

⬜ Other Commercial

🟦 Institutional

🟪 Industrial, Warehousing, and Utilities; Open Space

⬜ Transportation, Communications, and Utilities

🟩 Open Space

⬛ Vacant or Under Construction

⬜ Water

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Cook County Assessor

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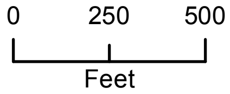

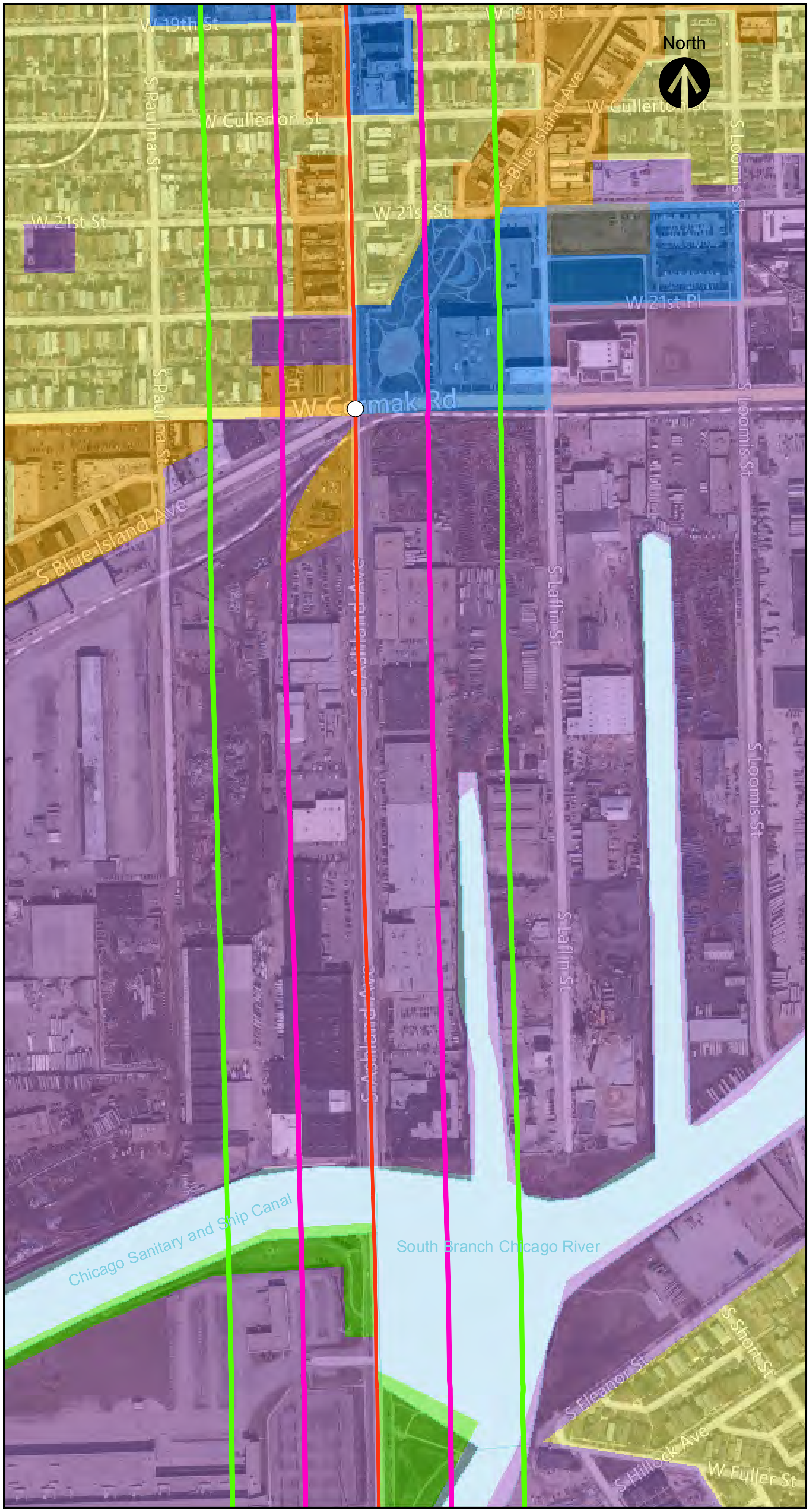

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Legend

Land Use

- ○ Proposed BRT Station
- ━ Proposed BRT Route
- ⬭ 250 Ft Buffer
- ⬭ 500 Ft Buffer
- ▨ Residential
- ▨ Retail Service
- ▨ Office Professional
- ▨ Urban Mix
- ▨ Other Commercial
- ▨ Institutional
- ▨ Industrial, Warehousing, and Utilities; Open Space
- ▨ Transportation, Communications, and Utilities
- ▨ Open Space
- ▨ Vacant or Under Construction
- ▨ Water

Data source:
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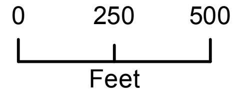

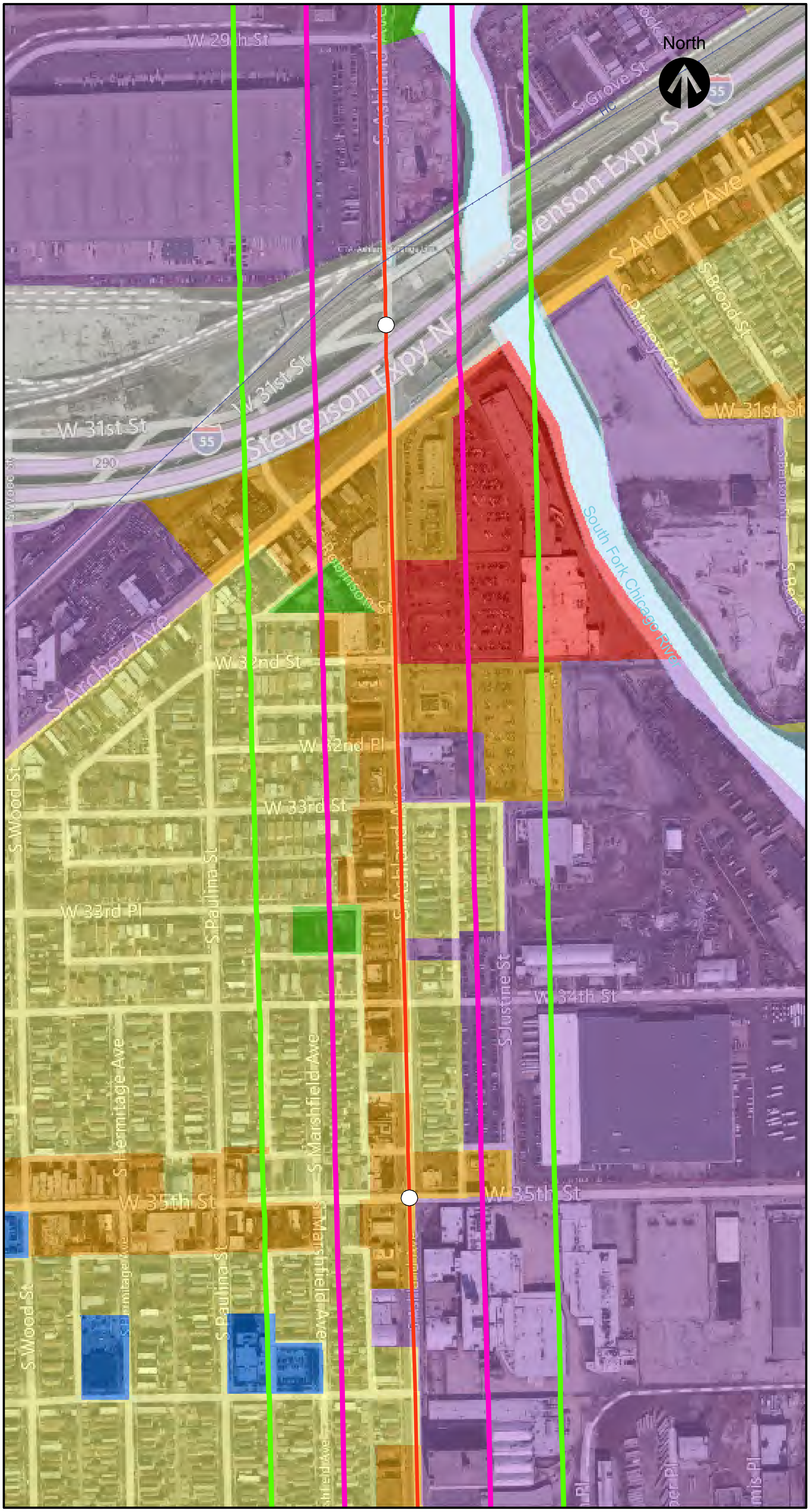

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Legend

Land Use

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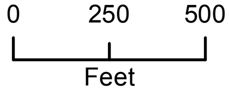

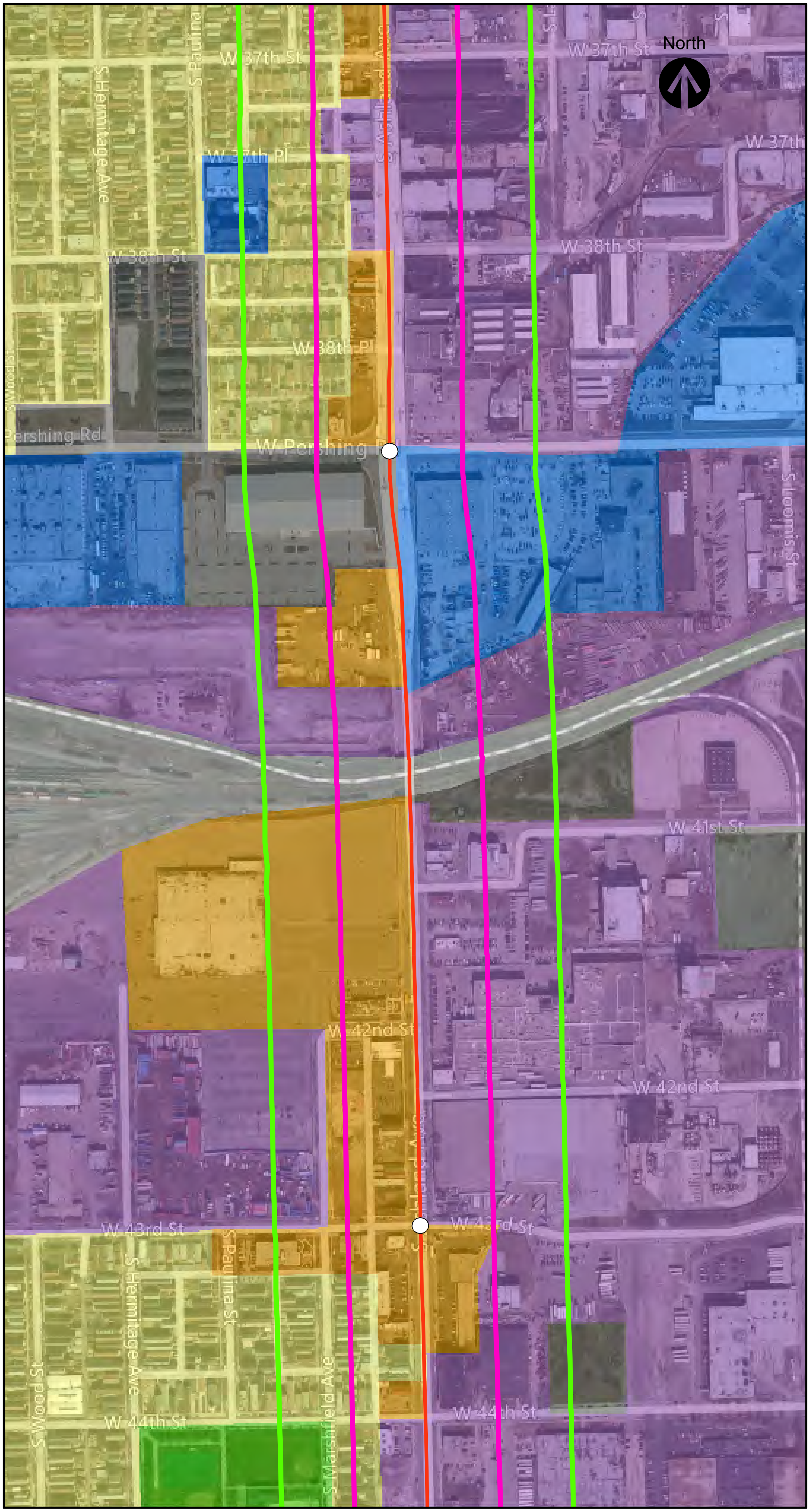

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Legend

Land Use

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— Proposed BRT Route

○ 250 Ft Buffer

○ 500 Ft Buffer

■ Residential

■ Retail Service

■ Office Professional

■ Urban Mix

■ Other Commercial

■ Institutional

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■ Transportation, Communications, and Utilities

■ Open Space

■ Vacant or Under Construction

■ Water

Data source:

Cook County Assessor

Scale

0 250 500

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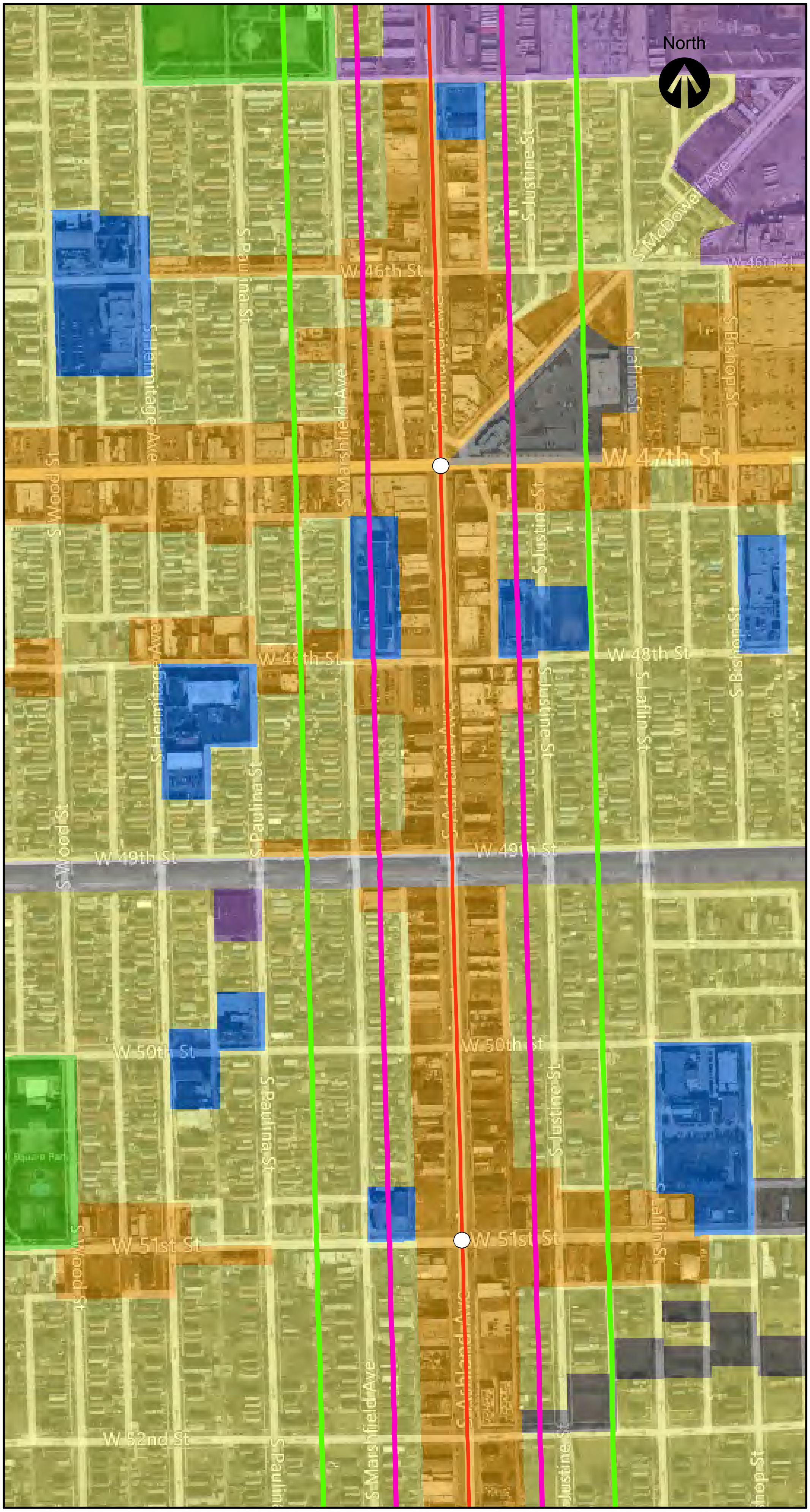

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Legend

Land Use

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— Proposed BRT Route

⬭ 250 Ft Buffer

⬭ 500 Ft Buffer

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■ Retail Service

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■ Urban Mix

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■ Institutional

■ Industrial, Warehousing, and Utilities; Open Space

■ Transportation, Communications, and Utilities

■ Open Space

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■ Water

Data source:
Cook County Assessor

Scale

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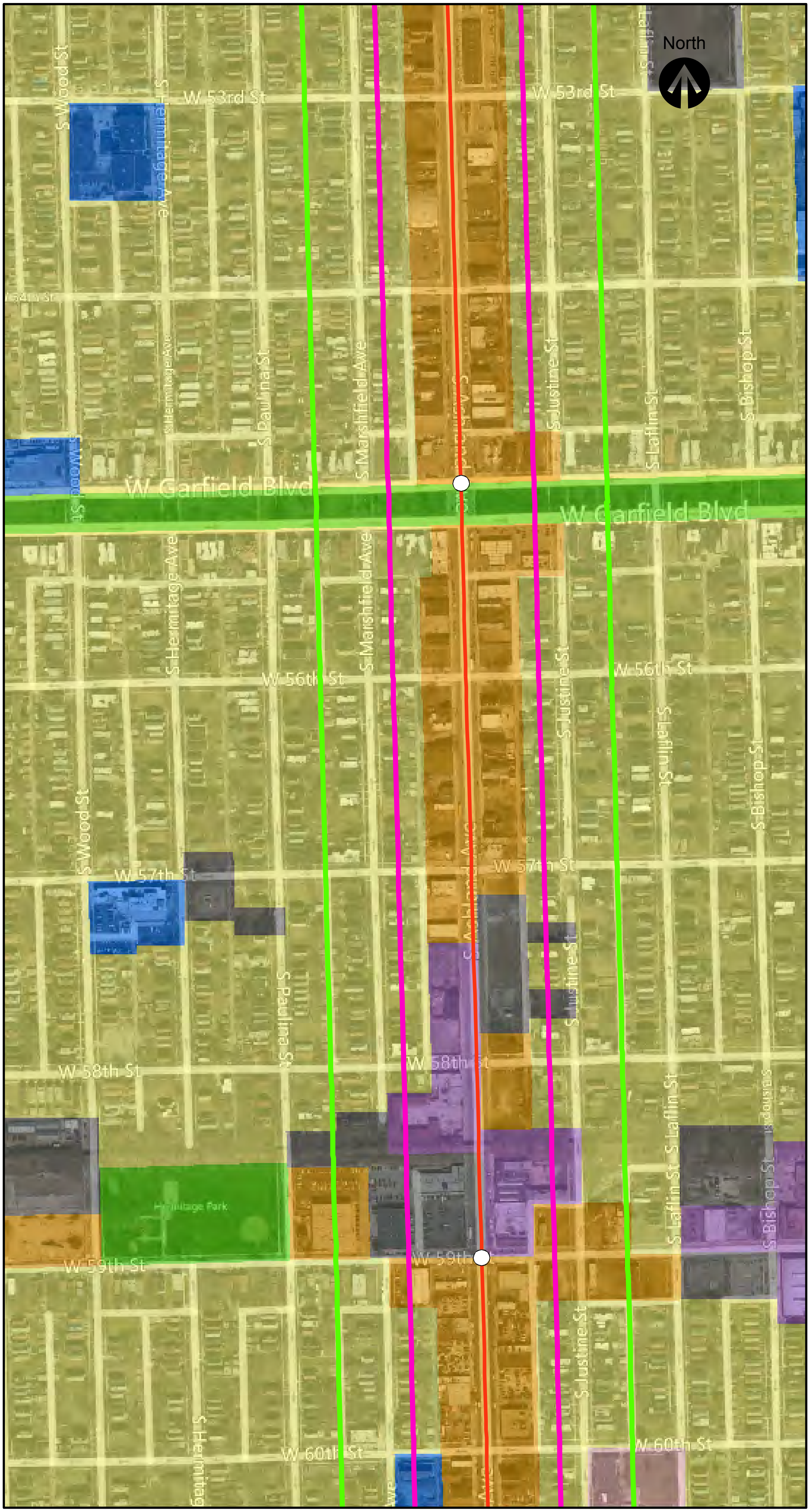
Feet



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Legend

Land Use

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― Proposed BRT Route

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⬭ 500 Ft Buffer

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🟥 Retail Service

🟪 Office Professional

🟧 Urban Mix

🟥 Other Commercial

🟦 Institutional

🟪 Industrial, Warehousing, and Utilities; Open Space

⬜ Transportation, Communications, and Utilities

🟩 Open Space

⬛ Vacant or Under Construction

🟦 Water

Data source:

Cook County Assessor

Scale

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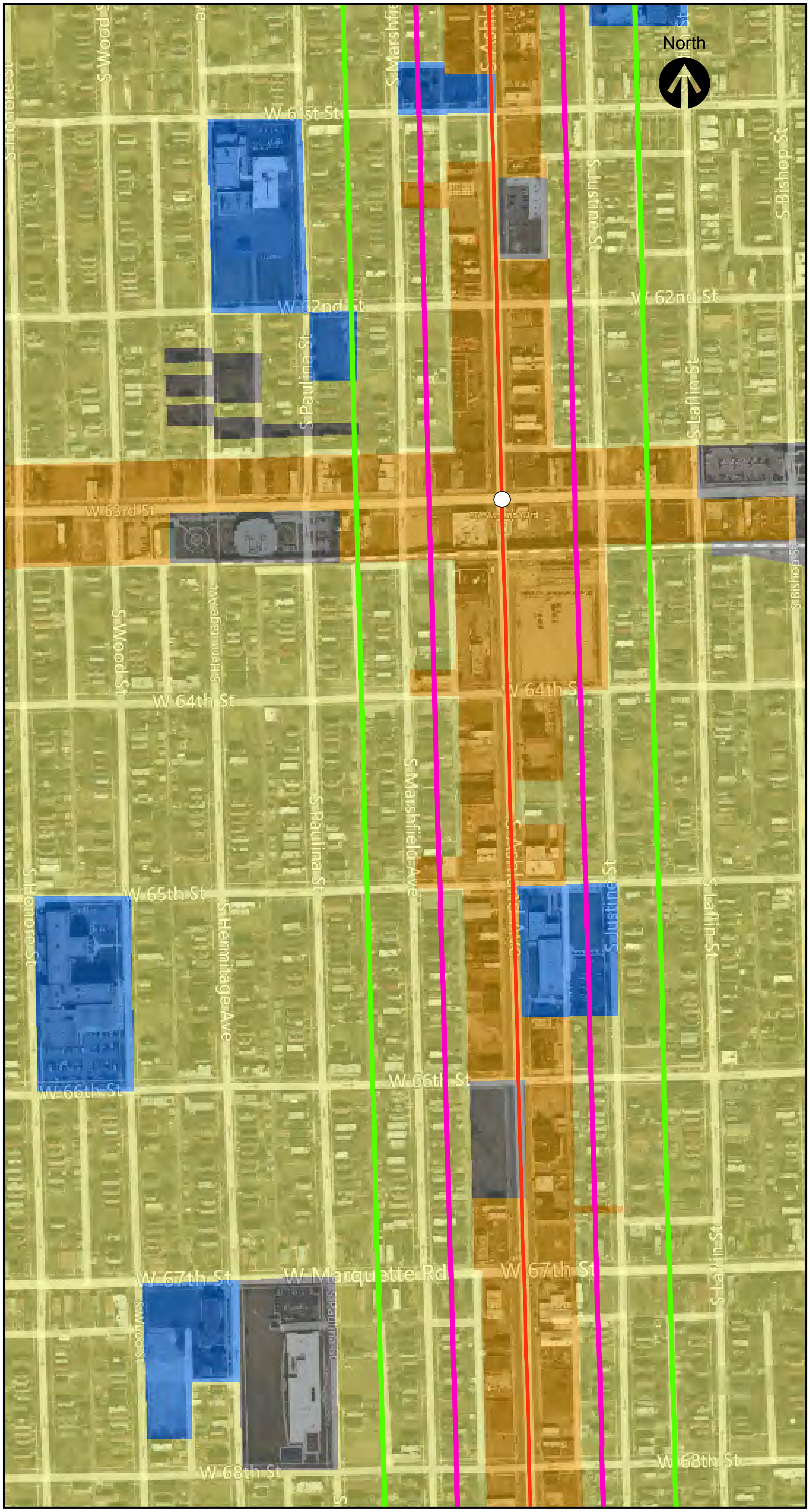
Feet



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Legend

Land Use

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— Proposed BRT Route

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⬭ 500 Ft Buffer

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🟩 Open Space

■ Vacant or Under Construction

■ Water

Data source:
Cook County Assessor

Scale

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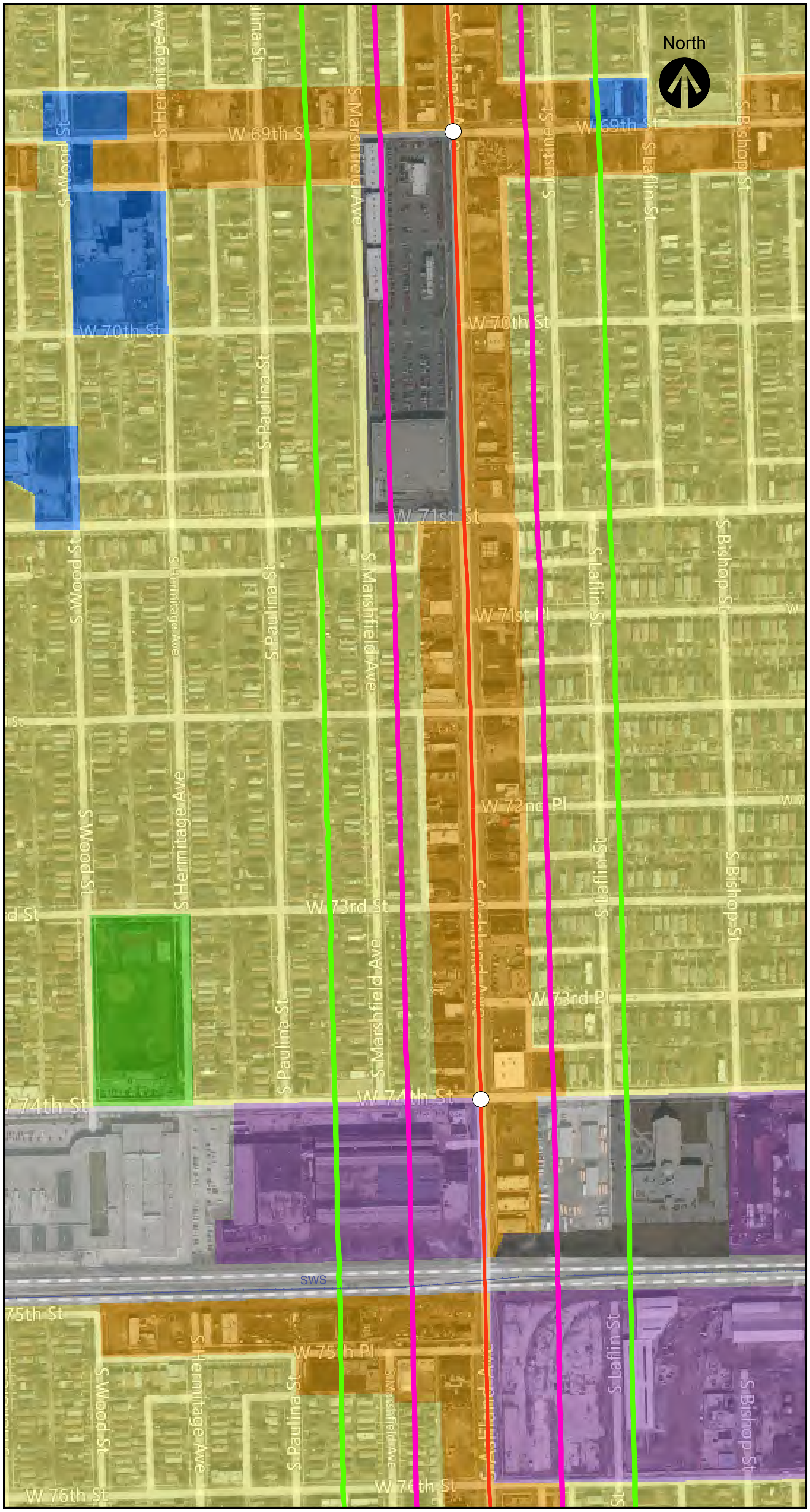
Feet



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Legend

Land Use

- ○ Proposed BRT Station
- — Proposed BRT Route
- ⬭ 250 Ft Buffer
- ⬭ 500 Ft Buffer
- 🟨 Residential
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- ⬛ Vacant or Under Construction
- ▭ Water

Data source:
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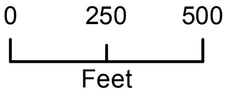

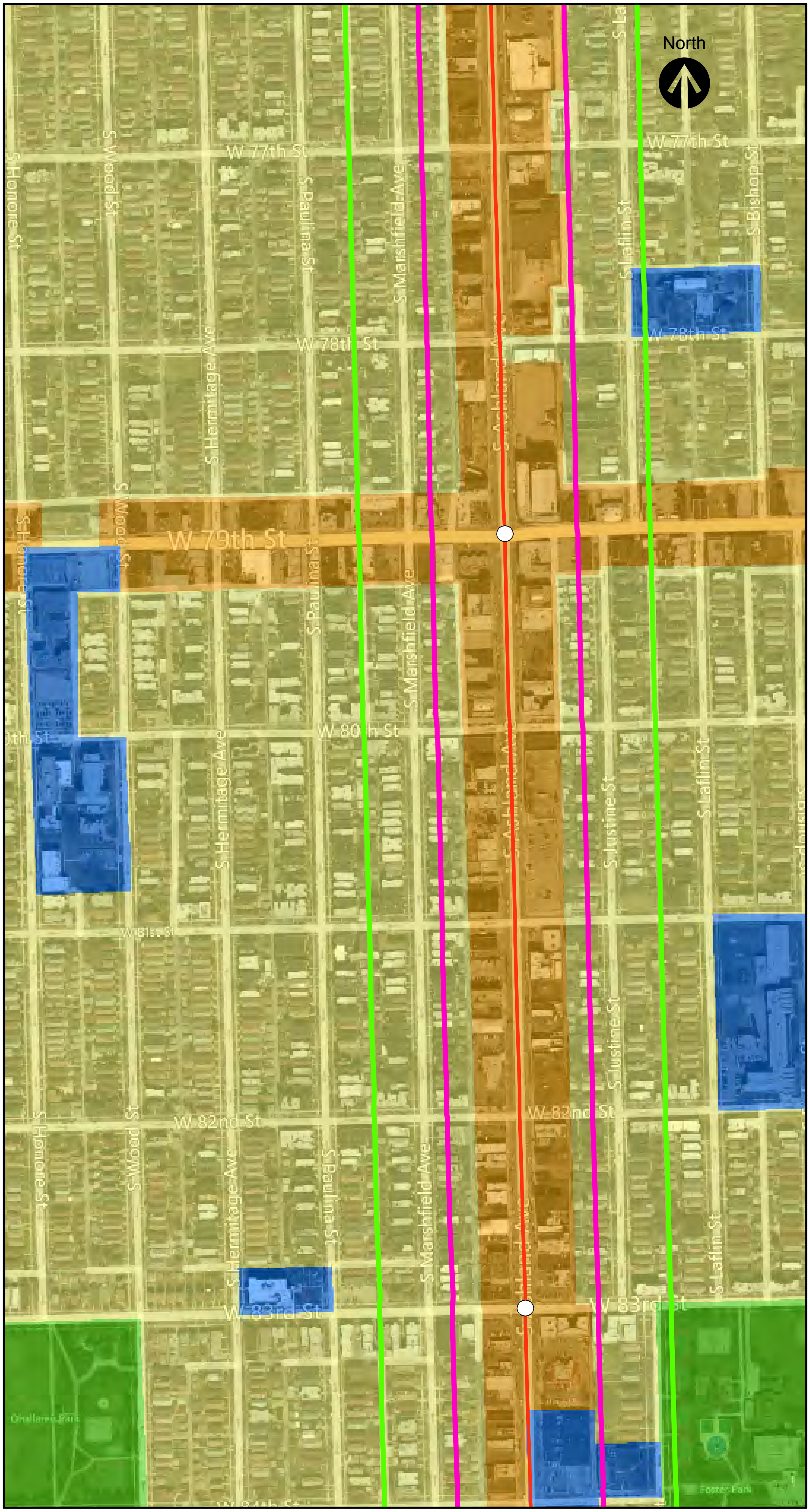

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Legend

Land Use

○ Proposed BRT Station

— Proposed BRT Route

○ 250 Ft Buffer

○ 500 Ft Buffer

🟨 Residential

🟥 Retail Service

🟪 Office Professional

🟧 Urban Mix

⬜ Other Commercial

🟦 Institutional

🟪 Industrial, Warehousing, and Utilities; Open Space

⬜ Transportation, Communications, and Utilities

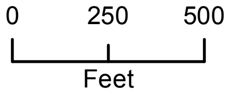
🟩 Open Space

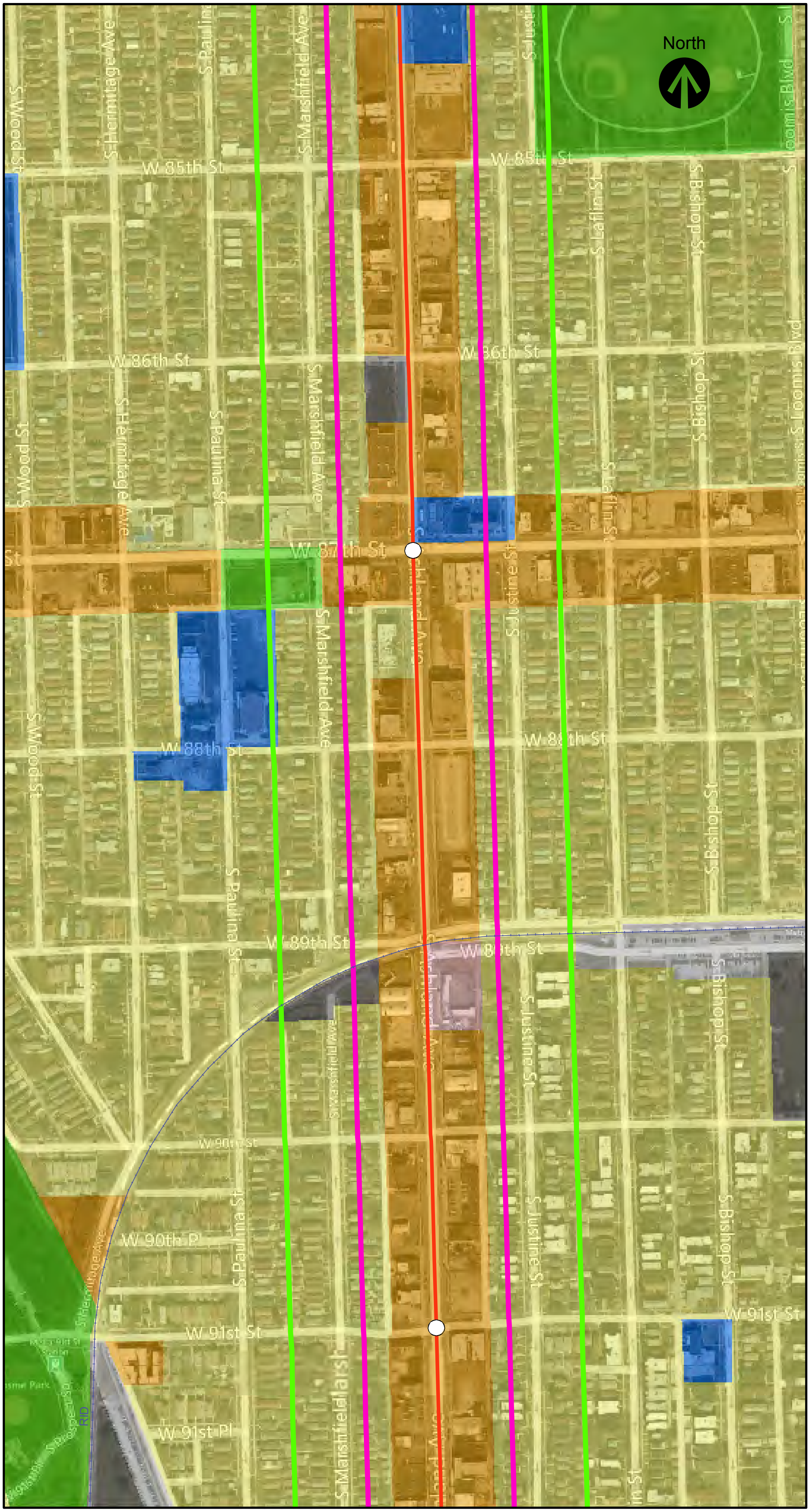
⬛ Vacant or Under Construction

⬜ Water

Data source:
Cook County Assessor

Scale





Inset

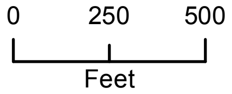
Legend

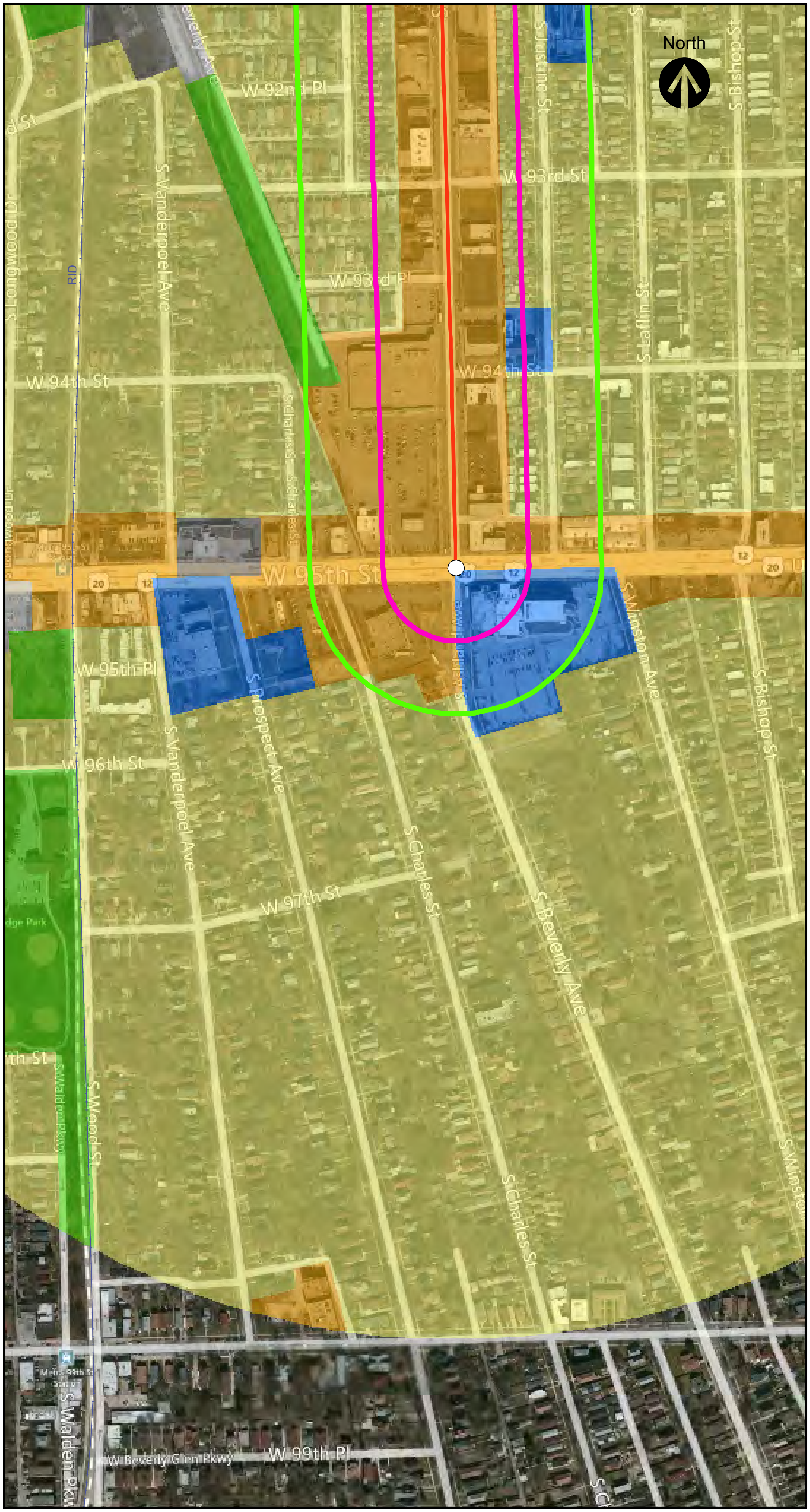
Land Use

- ○ Proposed BRT Station
- — Proposed BRT Route
- ⬭ 250 Ft Buffer
- ⬭ 500 Ft Buffer
- 🟨 Residential
- 🟥 Retail Service
- 🟪 Office Professional
- 🟧 Urban Mix
- ▢ Other Commercial
- 🟦 Institutional
- 🟪 Industrial, Warehousing, and Utilities; Open Space
- ⬜ Transportation, Communications, and Utilities
- 🟩 Open Space
- ⬛ Vacant or Under Construction
- ⬜ Water

Data source:
Cook County Assessor

Scale





Inset

Legend

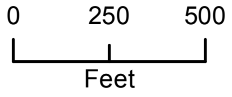
Land Use

- ○ Proposed BRT Station
- — Proposed BRT Route
- ⬭ 250 Ft Buffer
- ⬭ 500 Ft Buffer
- 🟨 Residential
- 🟥 Retail Service
- 🟪 Office Professional
- 🟧 Urban Mix
- ▨ Other Commercial
- 🟦 Institutional
- 🟪 Industrial, Warehousing, and Utilities; Open Space
- ▨ Transportation, Communications, and Utilities
- 🟩 Open Space
- ▨ Vacant or Under Construction
- ▨ Water

Data source:

Cook County Assessor

Scale



Attachment B

FTA Noise Impact Assessment Spreadsheets

Federal Transit Administration
Noise Impact Assessment Spreadsheet
Copyright 2007 HMMH Inc.
version: 7/3/2007

Project:	**Asland BRT Corridor**

Receiver Parameters	
Receiver:	**Receiver at 50' from BRT Centerline**
Land Use Category:	**2. Residential**
Existing Noise (Measured or Generic Value):	**60 dBA**

Noise Source Parameters	
Number of Noise Sources:	**2**

Noise Source Parameters		**Source 1**
	Source Type:	Highway Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	50
	Number of Intervening Rows of Buildings	0
Adjustments	**Noise Barrier?**	No

Noise Source Parameters		**Source 2**
	Source Type:	Highway Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	50
	Number of Intervening Rows of Buildings	
Adjustments	**Noise Barrier?**	No

Project Results Summary

Existing Ldn:	60 dBA
Total Project Ldn:	59 dBA
Total Noise Exposure:	63 dBA
Increase:	3 dB
Impact?:	**Moderate**

Distance to Impact Contours

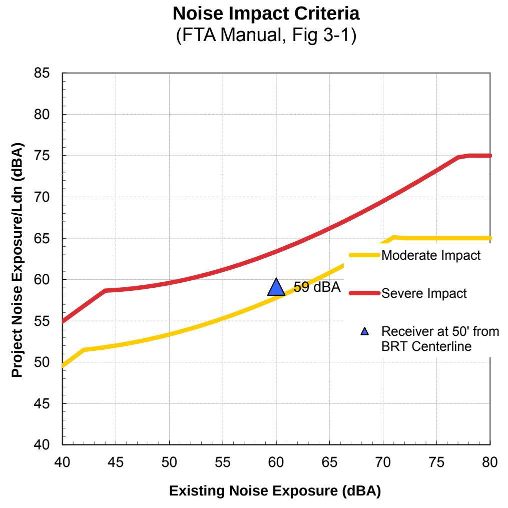
Dist to Mod. Impact Contour (Sources 1+2):	62 ft
Dist to Sev. Impact Contour (Sources 1+2):	26 ft

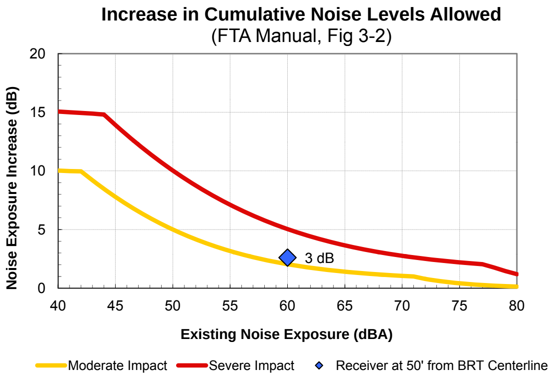
Source 1 Results

Leq(day):	49.7 dBA
Leq(night):	49.7 dBA
Ldn:	56.1 dBA

Source 2 Results

Leq(day):	49.7 dBA
Leq(night):	49.7 dBA
Ldn:	56.1 dBA
Incremental Ldn (Src 1-2):	59.2 dBA





Federal Transit Administration
Noise Impact Assessment Spreadsheet
Copyright 2007 HMMH Inc.
version: 7/3/2007

Project:	**Asland BRT Corridor**

Receiver Parameters	
Receiver:	**Receiver at 100' from BRT Centerline**
Land Use Category:	**2. Residential**
Existing Noise (Measured or Generic Value):	**60 dBA**

Noise Source Parameters	
Number of Noise Sources:	**2**

Noise Source Parameters		**Source 1**
	Source Type:	Highway□Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	100
	Number of Intervening Rows of Buildings	0
Adjustments	**Noise Barrier?**	No

Noise Source Parameters		**Source 2**
	Source Type:	Highway□Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	100
	Number of Intervening Rows of Buildings	
Adjustments	**Noise Barrier?**	No

Project Results Summary

Existing Ldn:	60 dBA
Total Project Ldn:	55 dBA
Total Noise Exposure:	61 dBA
Increase:	1 dB
Impact?:	None

Distance to Impact Contours

Dist to Mod. Impact Contour (Sources 1+2):	62 ft
Dist to Sev. Impact Contour (Sources 1+2):	26 ft

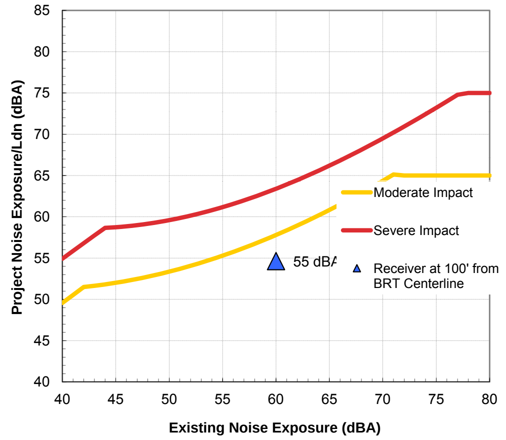
Source 1 Results

Leq(day):	45.2 dBA
Leq(night):	45.2 dBA
Ldn:	51.6 dBA

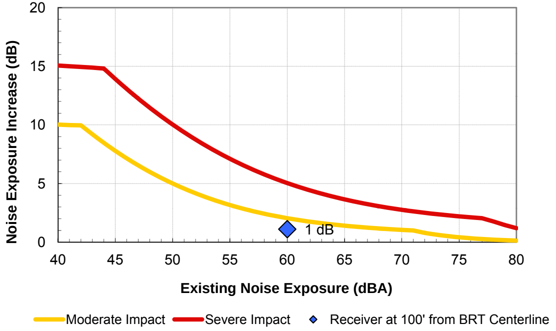
Source 2 Results

Leq(day):	45.2 dBA
Leq(night):	45.2 dBA
Ldn:	51.6 dBA
Incremental Ldn (Src 1-2):	54.6 dBA

Noise Impact Criteria
(FTA Manual, Fig 3-1)



Increase in Cumulative Noise Levels Allowed
(FTA Manual, Fig 3-2)



Federal Transit Administration
Noise Impact Assessment Spreadsheet
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version: 7/3/2007

Project:	**Asland BRT Corridor**

Receiver Parameters	
Receiver:	**Receiver at 150' from BRT Centerline**
Land Use Category:	**2. Residential**
Existing Noise (Measured or Generic Value):	**60 dBA**

Noise Source Parameters	
Number of Noise Sources:	**2**

Noise Source Parameters		**Source 1**
	Source Type:	Highway Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	150
	Number of Intervening Rows of Buildings	0
Adjustments	**Noise Barrier?**	No

Noise Source Parameters		**Source 2**
	Source Type:	Highway Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	150
	Number of Intervening Rows of Buildings	
Adjustments	**Noise Barrier?**	No

Project Results Summary

Existing Ldn:	60 dBA
Total Project Ldn:	52 dBA
Total Noise Exposure:	61 dBA
Increase:	1 dB
Impact?:	None

Distance to Impact Contours

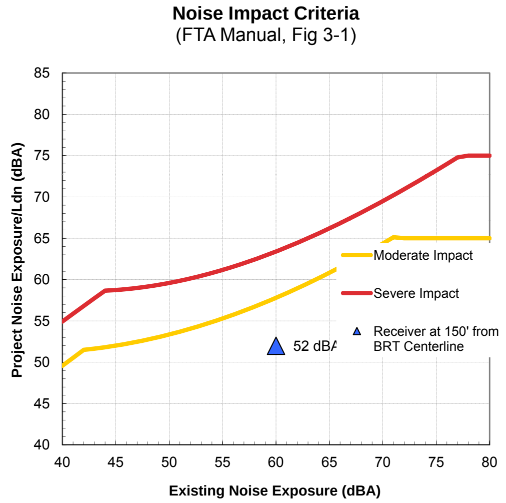
Dist to Mod. Impact Contour (Sources 1+2):	62 ft
Dist to Sev. Impact Contour (Sources 1+2):	26 ft

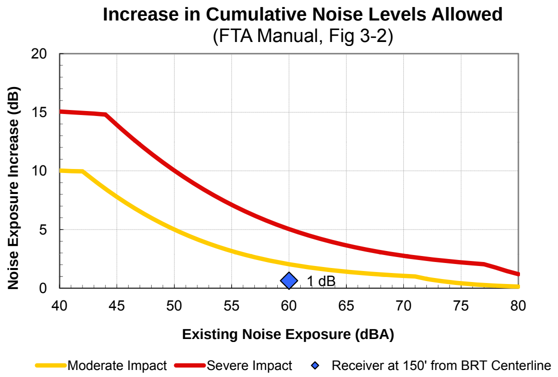
Source 1 Results

Leq(day):	42.6 dBA
Leq(night):	42.6 dBA
Ldn:	49.0 dBA

Source 2 Results

Leq(day):	42.6 dBA
Leq(night):	42.6 dBA
Ldn:	49.0 dBA
Incremental Ldn (Src 1-2):	52.0 dBA





Federal Transit Administration

Noise Impact Assessment Spreadsheet

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version: 7/3/2007

Project:	Asland BRT Corridor

Receiver Parameters	
Receiver:	**Receiver at 200' from BRT Centerline**
Land Use Category:	**2. Residential**
Existing Noise (Measured or Generic Value):	**60 dBA**

Noise Source Parameters	
Number of Noise Sources:	**2**

Noise Source Parameters		**Source 1**
	Source Type:	Highway Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	200
	Number of Intervening Rows of Buildings	0
Adjustments	**Noise Barrier?**	No

Noise Source Parameters		**Source 2**
	Source Type:	Highway Transit
	Specific Source:	Buses (diesel-powered)
Daytime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Nighttime hrs		
	Speed (mph)	15.9
	Avg. Number of Events/hr	12
Distance	**Distance from Source to Receiver (ft)**	200
	Number of Intervening Rows of Buildings	
Adjustments	**Noise Barrier?**	No

Project Results Summary

Existing Ldn:	60 dBA
Total Project Ldn:	50 dBA
Total Noise Exposure:	60 dBA
Increase:	0 dB
Impact?:	None

Distance to Impact Contours

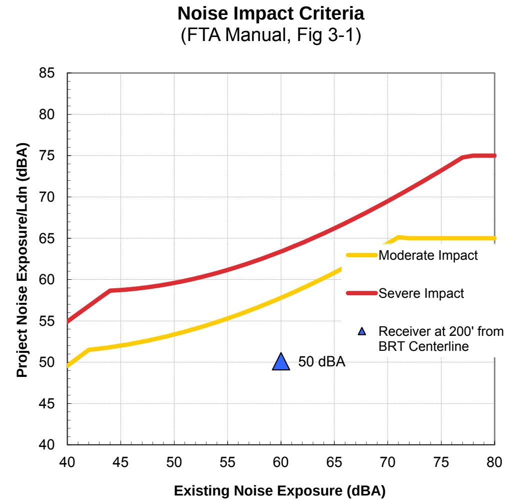
Dist to Mod. Impact Contour (Sources 1+2):	62 ft
Dist to Sev. Impact Contour (Sources 1+2):	26 ft

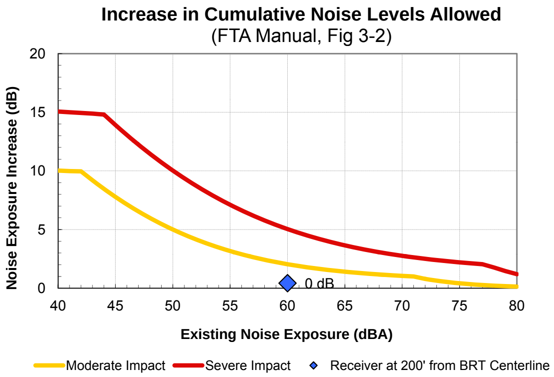
Source 1 Results

Leq(day):	40.7 dBA
Leq(night):	40.7 dBA
Ldn:	47.1 dBA

Source 2 Results

Leq(day):	40.7 dBA
Leq(night):	40.7 dBA
Ldn:	47.1 dBA
Incremental Ldn (Src 1-2):	50.1 dBA





Appendix E-5: Air Quality Technical Memorandum

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *August 8, 2013*

Subject: *Air Quality*

Prepared By: CDM Smith, Inc.

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and the Federal Transit Authority (FTA), is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue Bus Rapid Transit (BRT) Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

- Construction of 35 median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

Purpose

This memorandum presents the air quality analysis conducted for the proposed Ashland Avenue BRT Project. The analysis that follows includes a description of the existing conditions of the project site and surrounding area, the regulatory framework that guides the decision-making process, and potential air quality effects. Emission calculations and air quality modeling results are provided in **Attachment A**.

Criteria Air Pollutants

The United States Environmental Protection Agency (EPA) regulates ambient concentrations of seven common pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). Called criteria pollutants, various human health- and environmentally-based criteria set permissible levels for these pollutants.

Carbon Monoxide (CO)

CO is a colorless, odorless gas that is highly toxic. It is formed by the incomplete combustion of fuels. In Cook County, the majority of CO emissions occur from mobile sources (93 percent), fuel combustion (5 percent), and industrial processes (1 percent) (EPA2013a). Exposure to CO can reduce the body's ability to carry oxygen. CO exposure can cause people with several types of heart disease to experience chest pain (angina) when exercising or under increased stress. Extremely high levels of CO can cause death (EPA 2012a).

Lead (Pb)

Lead is a soft and chemically resistant metal that is naturally found in the environment. It has historically been found in motor vehicles and industrial sources, which lead to the EPA's efforts to remove Pb from gasoline in 1980 and beyond. The aviation sector continues to be a major source of Pb emissions from piston aircraft, as are certain industrial sectors like ore and metals processing (EPA 2012b).

In addition to Pb exposure through air, Pb can also accumulate in soils and other sediments, especially in urban environments where it would have accumulated from years of exposure from leaded gasoline. Lead exposure can adversely affect the nervous system, kidney function, immune system, reproductive and development systems, and the cardiovascular system. Lead exposure may also contribute to behavioral problems, learning deficits, and lowered IQ in infants and young children (EPA 2012c).

Nitrogen Dioxide (NO_2)

NO_2 is a reddish-brown to dark brown reactive gas that is formed during high-temperature combustion processes, such as those occurring in trucks, cars, and power plants. The sum of nitric oxide and NO_2 is commonly called nitrogen oxides (NOx), but other oxides like nitrous oxide and nitric acid are also classified as NOx.

Exposure to NO_2 can cause adverse respiratory effects including airway inflammation. NOx can react with ammonia, moisture, and other compounds to form small particles that can lodge deeply into sensitive parts of the lungs. This action can cause or worsen respiratory disease like emphysema and bronchitis, or can aggregative existing heart disease (EPA 2013b).

Ozone (O_3)

O_3 is a highly reactive and unstable gas that is formed in the atmosphere through complex reactions with sunlight, NOx, and volatile organic compounds (VOCs). Hot, sunny, and calm days promote O_3 formation. The EPA regulates ground-level O_3, which is not to be confused with stratospheric O_3. Ground-level O_3 is close to where people live, breathe, and exercise and can cause adverse health effects; stratospheric O_3 is high in the atmosphere and reduces the amount of ultraviolet light entering the earth's atmosphere, which actually helps protect animal and plant life.

Certain people are particularly sensitive to the effects of O_3 including people with lung disease, children, older adults, and active people. Generally, as O_3 concentrations increase, both the number of people affected and the seriousness of the health effects increase. The effects of exposure to ground-level O_3 include cough, chest tightness, and pain upon taking a deep breath; worsening of wheezing and other asthma symptoms; reduced lung function; and increase hospitalizations for respiratory causes.

O_3 also has detrimental effects on the environment. O_3 exposure can damage cells and leaf tissue, reducing plants' ability to photosynthesize and produce food. Plants will grow more leaves in an attempt to produce more food, but this response has the net effect of making plants more susceptible for disease, pests, cold, and drought. O_3 can also damage materials like rubber, plastics, fabrics, paint and metals (EPA 2003; EPA 2009).

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter consists of solid and liquid particles of dust, soot, aerosols, and other matter small enough to remain suspended in the air for a long period of time. Particulate matter is divided into two size classes of particles: particles up to 10 microns[1] (PM_{10}) and particles up to 2.5 microns ($PM_{2.5}$). To place the sizes in perspective, a human hair is approximately 60 microns in diameter, which makes it six times larger than the largest coarse particle and over 20 times larger than the largest fine particle.

Primary particles are those that are directly emitted from a source, such as construction sites, unpaved roads, fields, smokestacks, or fires. Burning fuels primarily produces $PM_{2.5}$, while other sources like windblown dust contribute to PM_{10} emissions. Secondary formation of $PM_{2.5}$ can occur from complex reactions in the atmosphere of pollutants like NOx, SOx, VOCs, and ammonia. Most of the $PM_{2.5}$ pollution in the United States occurs from these secondary reactions as opposed to direct (primary) emissions.

Particles smaller than 10 microns (i.e., PM_{10} and $PM_{2.5}$) represent that portion of particulate matter thought to represent the greatest hazard to public health because they can become deeply embedded in someone's lungs. This can lead to adverse health effects including premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms (e.g., irritation of the airways, coughing, or difficulty breathing). Aside from adverse health effects, $PM_{2.5}$ is primarily responsible for reduced visibility (haze) in the United States. Particulate matter can also cause aesthetic damage by staining or damaging stone and other materials (EPA 2013c; EPA 2013d).

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[1] A micron is a unit of measurement that is one-millionth of a meter. A meter is slightly larger than 3 feet.

Sulfur Dioxide (SO_2)

SO_2 is formed when locomotives, ships, and nonroad diesel equipment burn sulfur-containing fuel. Certain industrial processes, such as petroleum refining and metal processing, also contribute to SO_2 emissions. Health effects of SO_2 exposure including bronchoconstriction and increased asthma symptoms. SOx can also react with other compounds in the atmosphere to form small particles. Exposure to the resulting particles can aggravate existing heart disease, leading to increased hospital admissions and premature death (EPA 2012d).

Regulatory Setting

Air quality management and protection responsibilities exist in federal, state, and local levels of government. The federal Clean Air Act (CAA) is the primary statue that establishes ambient air quality standards and establishes regulatory authorities to enforce regulations designed to attain those standards.

Federal

The EPA is responsible for implementation of the CAA. The CAA was enacted in 1955 and was amended in 1963, 1965, 1967, 1970, 1977, 1990, and 1997. Under authority of the CAA, EPA established National Ambient Air Quality Standards (NAAQS) for CO, Pb, NO_2, O_3, PM_{10}, $PM_{2.5}$, and SO_2.

Table 1 presents the current NAAQS for the criteria pollutants. O_3 is a secondary pollutant, meaning that it is formed in the atmosphere from reactions of precursor compounds under certain conditions. Primary precursor compounds that lead to formation of O_3 include VOCs and NOx. $PM_{2.5}$ can be emitted directly from sources (e.g., engines) or can form in the atmosphere from precursor compounds. $PM_{2.5}$ precursor compounds in the area of analysis include SOx, NOx, and VOCs.

Table 1: National Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary	Violation Criteria
CO	1 Hour	35 ppm (40 mg/m^3)	N/A	Not to be exceeded more than once per year
	8 Hour	9 ppm (10 mg/m^3)		
NO_2	1 Hour	100 ppb (188 µg/m^3)	N/A	98th percentile of 1-hour daily maximum concentrations, averaged over three years
	Annual	53 ppb (100 µg/m^3)	Same as Primary Standard	Annual mean
O_3	8 Hour	0.075 ppm (147 µg/m^3)	Same as Primary Standard	Annual fourth-highest daily maximum 8-hour concentration, averaged over three years

Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary	Violation Criteria
Pb	Rolling 3-Month Average	0.15 μg/m^3	Same as Primary Standard	Not to be exceeded
PM_{10}	24 Hour	150 μg/m^3	Same as Primary Standard	Not to be exceeded more than once per year on average over three years
$PM_{2.5}$	24 Hour	35 μg/m^3	Same as Primary Standard	98th percentile, averaged over three years
	Annual (1)	12 μg/m^3	15 μg/m^3	Annual mean, averaged over three years
SO_2	1 Hour	75 ppb (196 μg/m^3)	N/A	99th percentile of 1-hour daily maximum concentrations, averaged over three years
	3 Hour	N/A	0.5 ppm (1,300 μg/m^3)	Not to be exceeded more than once per year
	24 Hour	0.14 ppm (366 μg/m^3) (2)	N/A	Not to be exceeded more than once per year
	Annual	0.030 ppm (79 μg/m^3) (2)		Annual mean

Source: EPA 2012e; 40 CFR 50.

Notes:

(1) On January 15, 2013, the EPA published a final rule to lower the primary annual $PM_{2.5}$ NAAQS to 12.0 μg/m^3. The final rule became effective on March 18, 2013 (78 Federal Register [FR] 3086).

(2) On June 22, 2010, the 24-hour and annual primary SO_2 NAAQS were revoked (75 FR 35520). The 1971 SO_2 NAAQS (0.14 parts per million [ppm] and 0.030 ppm for 24-hour and annual averaging periods) remain in effect until one year after an area is designated for the 2010 1-hour primary standard. The EPA is proposing to designate the Lemont Township area of Cook County as a nonattainment area for the 2010 1-hour SO2 NAAQS, but is deferring action on designating other portions of Cook County (2013e)

Key:

μg/m^3 = micrograms per cubic meter; CO = carbon monoxide; mg/m^3 = milligrams per cubic meter; N/A = not applicable; NAAQS = National Ambient Air Quality Standard; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ppb = parts per billion; ppm = parts per million; SO_2 = sulfur dioxide; Pb = lead

The Federal CAA requires states to classify air quality control regions (or portions thereof) as either attainment or nonattainment with respect to criteria air pollutants, based on whether the NAAQS have been achieved. Areas that previously exceeded the NAAQS, but have since attained the standard, are called maintenance areas. States are also required to prepare State Implementation Plans (SIPs) containing emission reduction strategies to maintain the NAAQS for those areas designated as attainment and to attain the NAAQS for those areas designated as nonattainment.

Certain pollutants, namely O_3 and PM_{10}, are further subdivided based on how close an area is to achieving the NAAQS. The possible classifications for the O_3 NAAQS are marginal, moderate, serious, severe, or extreme. Areas with worse classifications are given more time to attain the NAAQS than areas with better air quality. For example, an area classified as an extreme nonattainment area has an attainment date of December 31, 2032 (20 years from the date of designation), while an area classified as a marginal nonattainment area has until December 31, 2015 to attain the NAAQS (77 FR 30160). The possible classifications for the PM_{10} NAAQS are moderate and serious. Section 188 of the CAA (42 United States Code [USC] 7513) states that all areas designated nonattainment for the PM_{10} NAAQS are to be initially classified as moderate; however, an area can be reclassified as serious if the EPA determines that the area cannot practicably attain the standard by the attainment date. **Table 2** summarizes the attainment status for Cook County.

Table 2: Attainment Status for Cook County

Pollutant	Designation
CO	Attainment
NO_2	Attainment
O_3	Nonattainment, marginal
Pb	Nonattainment (1)
PM_{10}	Maintenance (2)
$PM_{2.5}$	Nonattainment
SO_2	Attainment (3)

Source: EPA 2012f; 40 CFR 81.

Notes:

(1) Nonattainment area for Chicago only, defined as the area bounded by Damen Ave. on the west, Roosevelt Rd. on the north, the Dan Ryan Expressway on the east, and the Stevenson Expressway on the south.

(2) Maintenance area for Southeast Chicago only, defined as the area bounded on the north by 79th Street, on the west by Interstate 57 between Sibley Boulevard and Interstate 94 between Interstate 57 and 79th Street, on the south by Sibley Boulevard, and on the east by the Illinois/Indiana State line.

(3) Attainment designation based on 1971 SO_2 NAAQS.

Key:

CO = carbon monoxide; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide

Figure 1 illustrates the nonattainment and maintenance areas for Pb and PM_{10}.The nonattainment areas for O_3 and $PM_{2.5}$ cover all of Cook County and are not shown on the figure.

Transportation Conformity

Approval, funding, or implementation of Federal Highway Administration (FHWA) and FTA projects is subject to the transportation conformity regulations under the CAA (40 CFR 93 Subpart A). Cook County, or portions thereof, is designated as a nonattainment area for O_3, $PM_{2.5}$, and Pb and as a maintenance area for PM_{10}. If a potential project is included in a conforming transportation plan[2] and transportation improvement program (TIP), then the project is already included in the emission budgets developed for the region. Thus, a unique, regional analysis of project emissions would not be required; however, analysis regarding possible localized impacts is still required.

This project is not included in the fiscal year 2010 - 2015 TIP endorsed by the Metropolitan Planning Organization (MPO) Policy Committee of the Chicago Metropolitan Agency for Planning (CMAP) for the region in which the project is located. Projects in the TIP are considered to be consistent with GO TO 2040, the 2040 regional transportation plan endorsed by CMAP. While the

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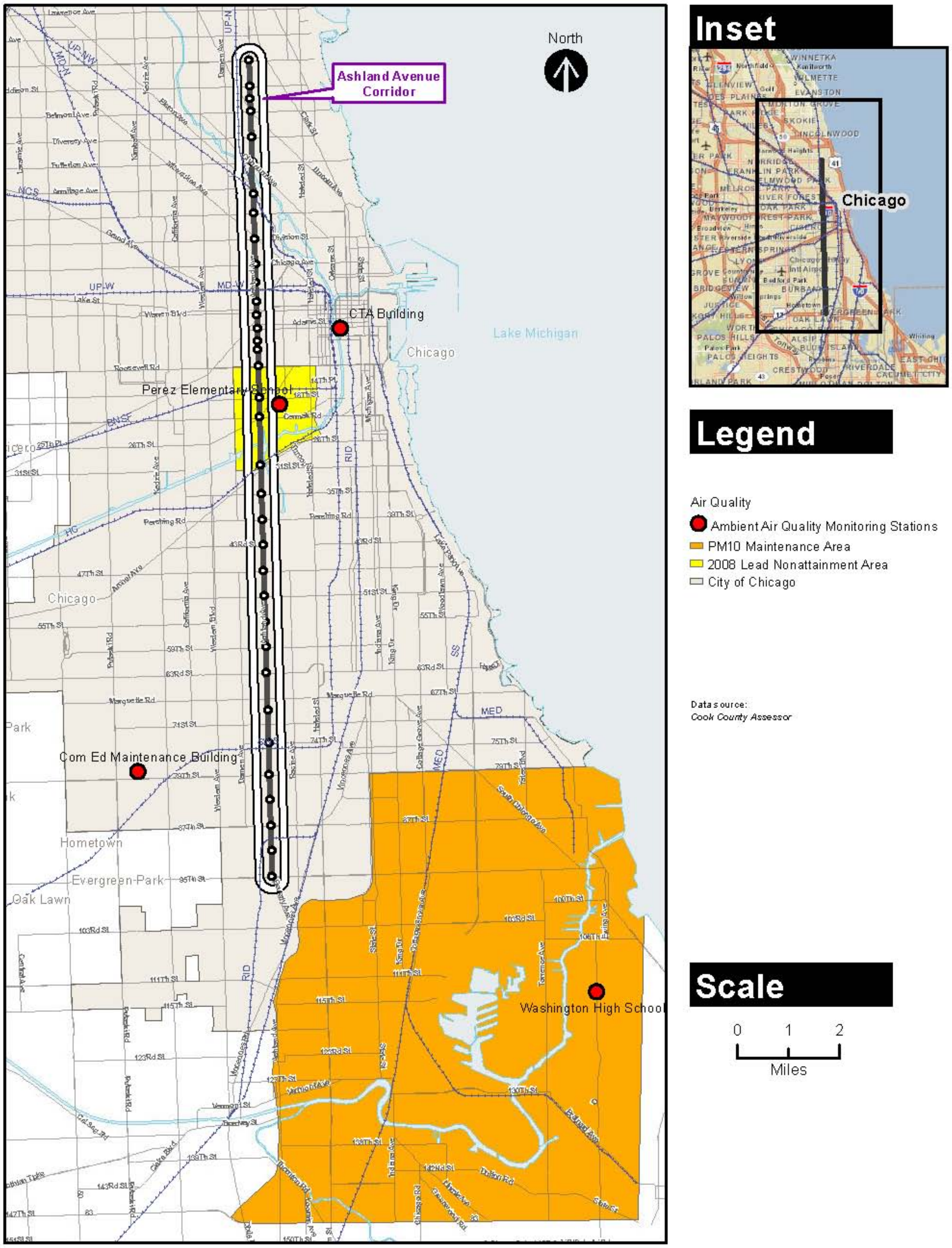
[2] A transportation plan is defined as the “official intermodal metropolitan transportation plan that is developed through the metropolitan planning process for the metropolitan planning area, developed pursuant to 23 CFR part 450” (40 CFR 93.101).

Figure 1: Air Quality Monitoring Stations, PM_{10} Maintenance Area, and Lead Nonattainment Areas



project is currently not included in the TIP, Chicago Transit Authority (CTA) is currently working with CMAP to include the project within the TIP in the future.

On October 25, 2010, the FHWA and the FTA determined that the 2040 regional transportation plan conforms to the State Implementation Plan (SIP) and the transportation-related requirements of the 1990 CAA Amendments. On March 20, 2013, the FHWA and the FTA determined that the TIP also conforms with the SIP and the CAA Amendments. These findings were in accordance with 40 CFR Part 93, "Determining Conformity of Federal Actions to State or Federal Implementation Plans."

In order for a FHWA/FTA project to be found to conform, regardless of whether it is in a conforming transportation plan or TIP or not, the following criteria and procedures must be followed:

- §93.110 – The conformity determination must be based upon the most recent planning assumptions in force at the time the conformity analysis begins.
- §93.111 – The conformity determination must be based on the latest emission estimation model available.
- §93.112 – Conformity must be determined according to the consultation procedures in 40 CFR 93 Subpart A.
- §93.114 – There must be a currently conforming Transportation Plan and currently conforming TIP at the time of project approval.
- §93.116 – The project must not cause or contribute to any new localized CO, PM_{10}, and/or $PM_{2.5}$ violations or increase the frequency of severity of any existing CO, PM_{10}, and $PM_{2.5}$ violations.
- §93.117 – The project must comply with any PM_{10} and $PM_{2.5}$ control measures in the applicable SIP.

For the purposes of this analysis, it is assumed that the Ashland Avenue BRT Project will be included in the TIP and would conform with the regional emissions budgets contained in the regional comprehensive transportation plan.

State

The Illinois Environmental Protection Act (Chapter 415 Illinois Compiled Statues [ILCS] 5) is the state's primary statue for establishing a unified, statewide program for restoring, protecting, and enhancing the quality of the environment. Title II of the Illinois Environmental Protection Act codifies requirements related to air pollution. Title II incorporates by rule requirements of the federal CAA, including standards related to the performance of new stationary sources and the establishment of national emission standards for hazardous air pollutants. The Act also requires the state to adopt regulations for toxic air contaminants in Illinois, finding that the existing federal programs may not be adequate to protect the public and the environment. The Act also provides specific requirements for the issuance of stationary source permits and for any necessary fees.

Title 35 of the Illinois Administrative Code contains pollution control standards and other rules adopted by the Pollution Control Board and the Illinois Environmental Protection Agency (IEPA). Subtitle B contains specific requirements for air pollution, including rules for permits and general provisions; the alternative reduction program; emission standards and limitations for stationary sources; peremptory rules; toxic air contaminants; open burning; emission standards and limitations for mobile sources; and air quality standards and episodes. The IEPA maintains various rules related to the regulation of stationary sources, including permitting, annual emissions reports, and air quality impact analyses.

Under conformity regulations of the CAA, CMAP is the MPO responsible for coordinating the development of transportation infrastructure in the northeastern Illinois counties of Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will. The CMAP planning area also includes Aux Sable Township in Grundy County. This ensures that air quality objectives are included with transportation goals in regional transportation plans. CMAP's planning responsibilities include housing, economic development, open space, the environment, and other quality-of-life issues.

Environmental Setting

Criteria air pollutants are monitored at several stations in Cook County. The closest monitoring station is located at the ComEd Maintenance Building (Station No. 17-031-0076), but it does not monitor all pollutants. Washington High School (Station No. 17-031-0022), the CTA Building, and Perez Elementary School (Station No. 17-031-0110) were used to evaluate ambient concentrations for PM_{10}, CO, and Pb, respectively. **Table 3** summarizes air quality data from these stations for the most recent three years of available data. **Figure 1** shows the location of each monitoring station in relation to the Ashland Avenue corridor.

Table 3: Ambient (Background) Air Quality Data

Pollutant (1)	NAAQS	2009	2010	2011	Design Value (2009-2011)
CO (2)					
Maximum 1-hour concentration (ppm)	35	3.3	4.3	4.7	n/a
Maximum 8-hour concentration (ppm)	9	1.5	1.4	1.8	n/a
Number of days exceeding 1-hour standard		0	0	0	
Number of days exceeding 8-hour standard		0	0	0	
Pb (3)					
Maximum 3-Month Rolling Mean (μg/m^3)	0.15	0.29	0.24	--	0.29
NO_2 (4)					
98th percentile 1-hour concentration (ppb)	100	57	56	58	57
Annual design value (ppb)	53	16	17	17	n/a
Number of days exceeding 1-hour standard		0	0	1	

Pollutant (1)	NAAQS	2009	2010	2011	Design Value (2009-2011)
O_3 (4)					
4th high 8-hour concentration (ppm)	0.075	0.073	0.068	0.067	0.069
Number of days exceeding 8-hour standard		3	0	0	
$PM_{2.5}$ (4)					
98th percentile 24-hour concentration (µg/m^3)	35	27.1	31	26.2	28.1
Annual design value (µg/m^3)	15	11.3	12.3	11.1	11.5
Number of days exceeding 24-hour standard		0	2	0	
PM_{10} (5)					
Maximum 24-hour concentration (µg/m^3)	150	83	91	58	n/a
Number of days exceeding 24-hour standard		0	0	0	0
SO_2					
99th Percentile 1-Hour Concentrations (ppb)	75	27	20	24	24
Maximum 3-hour block averages (ppb)	500	22	20	22	n/a
Number of days exceeding 1-hour standard		0	0	0	

Source: Illinois Environmental Protection Agency (IEPA) 2010; IEPA 2011; IEPA 2012.

Notes:

(1) An exceedance is not necessarily a violation. Violations are defined in 40 CFR 50.

(2) Data from CTA Building monitoring station.

(3) Data from Perez Elementary School monitoring station.

(4) Data from ComEd Maintenance Building monitoring station.

(5) Data from Washington High School monitoring station.

Key:

-- = There was insufficient (or no) data available to determine this value; µg/m^3 = micrograms per cubic meter; CO = carbon monoxide; NAAQS = National Ambient Air Quality Standard; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ppm = parts per million; SO_2 = sulfur dioxide

Methodology

CO Hot Spots

To determine if a CO hot spot (high localized ambient concentration) is created due to activities of the Ashland Avenue BRT Project, an analysis must be conducted to predict ambient CO concentrations from the near-field dispersion of the emissions. The analysis was completed using the EPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (1992). The guidelines provide a ranking and selection procedure to determine the intersections expected to have the highest CO concentration. The procedures require a CO hot spots analysis be completed for the top three intersections based on the worst level-of-service and the top three intersections based on the highest traffic volumes. This process was used for both the AM and PM peak hour for the Ashland Avenue BRT Project and duplicate intersections were removed. As a result, the following five intersections were used in the analysis:

- W Belmont Ave / N Lincoln Ave

- W Cermak Rd
- W Diversey Pkwy
- W Irving Park Rd
- W Roosevelt Rd

The first step in an air dispersion analysis is the selection of an applicable model. The EPA's *Guideline on Air Quality Models* (40 CFR 51, Appendix W) and the EPA's 1992 CO Hot Spot Guidelines recommend the use of CAL3QHC as the screening model for such analyses. CAL3QHC combines CALINE3 with a traffic model to calculate delays and queues that occur at signalized intersections.

CO emission factors were estimated using the EPA's Motor Vehicle Emission Simulator (MOVES), Version 2010b (2013f). Emission factors were developed in accordance with the EPA's *Using MOVES in Project-Level Carbon Monoxide Analyses* (2010) guidance document. The Illinois Environmental Protection Agency (IEPA) provided data for input into MOVES2010b, including fuel supply and formulation, inspection and maintenance information, and vehicle age distribution files. The average January temperature for 2015 from the IEPA's data files was used as the input for meteorology.

Regional Operational Emissions

Regional emissions were calculated from projected vehicle miles traveled (VMT) for each of the project alternatives. Regional daily VMT data was developed for the CMAP planning area for both the No-Build and Build Alternatives. The vehicle fleet mix was determined from the highway performance monitoring system (HPMS) data provided by IEPA with its MOVES2010b input files. The EPA's annual average weekday VMT calculator (2012g) was used to convert the daily VMT data to annual VMT.

This analysis used the current EPA-approved version of MOVES2010b (as revised January 2013) to develop emission factors for different vehicle classes. All vehicle types (motorcycles, passenger cars, passenger trucks, buses, and other trucks) contained in the IEPA's input data files were used to define the vehicle fleet mix (relative ratio of each vehicle type to total population). Because there would be no change to intercity buses and school buses between alternatives, emissions from these vehicles were not estimated. It was assumed that all transit buses would be diesel-fueled.

Environmental Impacts

Transportation Conformity

A transportation conformity determination is required for approval, funding, or implementation of FWHA/FTA projects. Transportation conformity provisions apply to emissions of O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ in nonattainment and maintenance areas. Transportation conformity determinations ensure that projects receiving federal funding or approval are consistent with air quality goals. A conformity determination demonstrates that the total emissions for a project are within emissions budgets established in a SIP.

It was assumed that the current TIP would be modified to include this project. As a result, this analysis is not required to demonstrate compliance with emissions budgets. It is necessary, however, to complete an analysis for localized impacts of CO, PM_{10}, and $PM_{2.5}$. As listed in 40 CFR 93 Subpart A, project-level conformity occurs when the following three conditions are met:

- The FHWA/FTA project must not cause or contribute to any new localized CO, PM_{10}, and/or $PM_{2.5}$ violations (§93.116).
- The project must not increase the frequency or severity of any existing CO, PM_{10}, and/or $PM_{2.5}$ violations in nonattainment or maintenance areas (§93.116).
- The project must comply with any PM_{10} and $PM_{2.5}$ control measures in the applicable implementation plan (§93.117).

Although Cook County is not a nonattainment or maintenance area for CO, a CO hot spots analysis was still completed to evaluate possible localized impacts as part of the NEPA analysis. Because of the LOS of the affected intersections (D, E, or F) and the proposed modifications to the traffic lanes it was necessary to evaluate if the Ashland Avenue BRT Project could cause adverse effects to air quality.

The EPA published the *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (2010b) to describe how to complete a PM hot spots analysis. A $PM_{2.5}$ hot spots analysis must be completed only for "projects of air quality concern," as defined in 40 CFR 93.123(b)(1). A project of air quality concern is defined as a project that could result in a significant increase in the number of diesel vehicles. Specifically, as defined in regulation, the following types of project s would require a PM hot-spots analysis:

- New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;
- Projects affecting intersections that are t LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D,E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- Expanded bus and rail terminals and transfer points that significant increase the number of diesel vehicles congregating at a single location; and

- Projects in or affecting locations, areas, or categories of sites which are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The transportation conformity regulation does not define a “significant increase in the number of diesel vehicles,” but the quantitative PM hot-spot guidance document (EPA 2010b) provides several examples of projects of local concern that would require a $PM_{2.5}$ hot-spot analysis. Because the Ashland Avenue BRT Project would increase the number of buses operated by CTA, it is possible that it could result in an expanded bus terminal from the additional buses. Appendix B of the EPA’s guidance (2010b) states that an example of a project of local air quality concern would be “an existing bus or intermodal terminal that has a large fleet where the number of diesel buses increases by 50% or more, as measured by bus arrivals.”

Following the implementation of the BRT, local bus service frequency would be based on demand. For the purposes of conducting this air quality analysis, it was assumed that implementation of BRT would reduce local bus trips to a peak of 3 per hour, but would add an additional 12 buses per hour on the BRT; therefore, the total number of buses per hour would be 15. While this would be a 50 percent increase in bus traffic, all buses would operate with clean diesel technology (i.e., diesel particulate filters) result in a decrease in regional $PM_{2.5}$ emissions compared with the No-Build Alternative. Therefore, the Build Alternative would not be a project of local concern. CTA has coordinated with CMAP as part of the interagency consultation process to confirm that this project is not a project of air quality concern and that a $PM_{2.5}$ analysis is not required.

Mobile Source Air Toxics

The FHWA published an *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* on December 6, 2012. This guidance document establishes the following tiered approach for analyzing mobile source air toxics (MSAT) in NEPA:

- No analysis for projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; or
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

The Ashland Avenue BRT Project would have no MSAT effects because VMT for the Ashland Avenue BRT Project would decrease compared to the no-build alternative. The Ashland Avenue BRT Project falls within the first tier of MSAT analysis, so no further action is required.

No-Build Alternative

The No-Build Alternative assumes the Ashland Avenue BRT Project would not be operational. This section provides a summary of the emissions associated with the No-Build Alternative.

Regional Emissions Inventory

The No-Build Alternative would not create new emissions or have negative operational air quality impacts. However, the No-Build Alternative would not reduce regional VMT-related emissions like the Ashland Avenue BRT Project.

NEPA requires project emissions to be compared to the future No-Build Alternative. This analysis calculated operational emissions from predicted VMT under the No-Build Alternative. Emissions of CO, NO_2, and SO_2 represent emissions from vehicle exhaust only. Emissions of PM_{10} and $PM_{2.5}$ include exhaust, tire wear, and brake wear. VOC emissions include exhaust and evaporative losses. **Table 4** summarizes operational emissions associated with the No-Build Alternative.

Table 4: Regional Emissions Inventory – No-Build Alternative

Source	Annual Emissions (tons per year)					
	VOC	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Regional Traffic	26,791	10,744	381,352	530	4,766	2,902
Buses	1	1	4	<1	1	<1
Total	26,791	10,745	381,356	530	4,767	2,903

Key:
CO = carbon monoxide; NO_2 = nitrogen dioxide; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide; VOC = volatile organic compound

CO Hot Spots

This analysis completed a CO hot spots evaluation that calculated localized impacts of CO concentrations at several intersections. The CAL3QHC model was used to evaluate whether CO concentrations at these intersections would exceed CAAQS or NAAQS for CO concentrations. The modeled concentrations include a 1-hour CO background concentration of 4.7 parts per million (ppm), which is the maximum monitored concentration from the past three years (2009 to 2011). A persistence factor of 0.7 (EPA 1992) was used to calculate the 8-hour CO concentration from the 1-hour value. **Table 5** shows the results of the analysis.

Table 5: Maximum CO Concentrations at Roadway Intersections Under No-Build Alternative

ID	Intersection	1-Hour Concentration (ppm)		8-Hour Concentration (ppm)		Exceeds NAAQS?	
		AM	PM	AM	PM	1-Hour	8-Hour
1011	W Belmont Ave / N Lincoln Ave	5.6	5.4	3.9	3.8	No	No
1109	W Cermak Rd	5.5	5.4	3.9	3.8	No	No
1018	W Diversey Pkwy	5.6	5.5	3.9	3.9	No	No
1001	W Irving Park Rd	5.5	5.4	3.9	3.8	No	No
1094	W Roosevelt Rd	6.1	6.8	4.3	4.8	No	No

Key:
NAAQS = National Ambient Air Quality Standard; ppm = parts per million

Ashland Avenue BRT Project

The Ashland Avenue BRT Project would include the operation of the BRT on the Ashland Avenue Corridor. The Ashland Avenue BRT Project would include a realignment of Ashland Avenue to allow the BRT to travel in the center of the street in what had previously been left-turn lanes.

Regional Emissions Inventory

The Ashland Avenue BRT Project would provide an alternative to automobile transportation in the region; therefore, it was necessary to evaluate regional traffic emissions to assess how the Ashland Avenue BRT Project would increase or decrease operational emissions from passenger vehicles. **Table 6** summarizes the regional traffic emissions inventory for the Ashland Avenue BRT Project.

Table 6: Regional Emissions Inventory – Ashland Avenue BRT Project

Source	Annual Emissions (tons per year)					
	VOC	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Regional Traffic	26,768	10,734	381,022	530	4,762	2,900
Buses	2	3	9	<1	1	1
Total	26,769	10,737	381,031	530	4,764	2,901
Increment Above No-Build Alternative	-22	-8	-325	<1	-3	-2

Key:
CO = carbon monoxide; NO_2 = nitrogen dioxide; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide; VOC = volatile organic compound

As shown in **Table 5**, emissions from regional traffic would decrease compared to the No-Build Alternative, but transit bus emissions would increase. The net effect would be to have a decrease in emissions for all pollutants. The Ashland Avenue BRT Project would have beneficial effects to air quality.

CO Hot Spots

This analysis completed a CO hot spots evaluation that calculated localized impacts of CO concentrations at several intersections. The CAL3QHC model was used to evaluate whether CO concentrations at these intersections would exceed CAAQS or NAAQS for CO concentrations. The modeled concentrations include a 1-hour CO background concentration of 4.7 parts per million (ppm), which is the maximum monitored concentration from the past three years (2009 to 2011). **Table 7** shows the results of the analysis.

Table 7: Maximum CO Concentrations at Roadway Intersections Under No-Build Alternative

ID	Intersection	1-Hour Concentration (ppm)	8-Hour Concentration (ppm)	Exceeds NAAQS?

		AM	PM	AM	PM	1-Hour	8-Hour
1011	W Belmont Ave / N Lincoln Ave	6.5	6.3	4.6	4.4	No	No
1109	W Cermak Rd	6.1	5.9	4.3	4.1	No	No
1018	W Diversey Pkwy	6.4	6.5	4.5	4.6	No	No
1001	W Irving Park Rd	5.5	5.7	3.9	4.0	No	No
1094	W Roosevelt Rd	6.1	7.0	4.3	4.9	No	No

Key:
NAAQS = National Ambient Air Quality Standard; ppm = parts per million

As shown in **Table 7**, the operation of the BRT would increase the 1-hour and 8-hour CO concentrations compared to the No-Build Alternative. While concentrations would increase, the NAAQS would not be exceeded. As a result, there would be no adverse air quality effects associated with the Ashland Avenue BRT Project.

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Attachment A

Emission Calculations and Air Quality Modeling Results

CTA Ashland Ave BRT
CMAP 2015 Regional Traffic Air Emissions

No Build

	Annual Emissions (tons per year)												
Source	**VOC**	**NO2**	**CO**	**SO2**	**PM10**	**PM2.5**	**Butadiene**	**Acetaldehyde**	**Acrolein**	**Benzene**	**Ethanol**	**Formaldehyde**	**MTBE**
11	625.7	10.3	4,439.2	2.2	22.9	20.0	1.9	4.4	0.2	11.6	47.7	4.6	0.0
21	7,819.3	806.9	103,639.6	133.1	815.7	434.9	34.1	83.9	3.5	197.3	457.7	84.0	0.0
31	11,378.3	2,348.4	185,779.3	237.2	1,573.1	828.6	54.3	136.7	6.6	310.6	555.7	148.2	0.0
32	4,082.2	1,220.9	66,917.5	76.8	607.8	353.4	19.2	58.3	4.4	107.2	177.6	79.6	0.0
42	0.6	1.1	3.7	0.0	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0
51	6.1	14.2	51.4	0.3	6.5	4.4	0.0	0.2	0.0	0.1	0.0	0.5	0.0
52	444.7	414.8	8,086.2	9.8	147.9	89.1	1.9	10.6	1.4	9.5	10.1	21.7	0.0
53	33.1	28.3	552.5	0.7	11.0	6.9	0.1	0.8	0.1	0.7	0.8	1.6	0.0
54	41.0	17.9	830.1	0.5	5.9	3.7	0.2	0.6	0.1	1.0	1.9	1.1	0.0
61	646.8	1,753.1	3,955.3	35.3	741.6	531.0	1.4	24.3	4.2	5.1	0.0	61.1	0.0
62	1,713.6	4,128.8	7,101.1	34.3	834.0	630.4	3.2	83.2	13.4	16.6	0.0	231.0	0.0
Total	**26,791.5**	**10,744.7**	**381,356.0**	**530.1**	**4,766.9**	**2,902.9**	**116.3**	**403.1**	**33.8**	**659.5**	**1,251.6**	**633.5**	**0.0**

Build

	Annual Emissions (tons per year)												
Source	**VOC**	**NO2**	**CO**	**SO2**	**PM10**	**PM2.5**	**Butadiene**	**Acetaldehyde**	**Acrolein**	**Benzene**	**Ethanol**	**Formaldehyde**	**MTBE**
11	625.2	10.3	4,435.3	2.2	22.9	19.9	1.9	4.4	0.2	11.6	47.6	4.6	0.0
21	7,812.5	806.2	103,549.8	133.0	815.0	434.6	34.0	83.9	3.5	197.1	457.3	83.9	0.0
31	11,368.4	2,346.4	185,618.4	237.0	1,571.8	827.9	54.3	136.5	6.6	310.4	555.2	148.1	0.0
32	4,078.7	1,219.8	66,859.5	76.7	607.3	353.1	19.1	58.2	4.4	107.1	177.5	79.5	0.0
42	1.5	2.7	9.1	0.0	1.4	1.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0
51	6.1	14.2	51.4	0.3	6.5	4.4	0.0	0.2	0.0	0.1	0.0	0.5	0.0
52	444.3	414.4	8,079.2	9.8	147.7	89.0	1.9	10.6	1.4	9.5	10.1	21.7	0.0
53	33.1	28.3	552.0	0.7	11.0	6.9	0.1	0.8	0.1	0.7	0.8	1.6	0.0
54	41.0	17.9	829.4	0.5	5.9	3.7	0.2	0.6	0.1	1.0	1.9	1.1	0.0
61	646.2	1,751.6	3,951.9	35.2	741.0	530.5	1.4	24.3	4.2	5.1	0.0	61.1	0.0
62	1,712.2	4,125.2	7,095.0	34.3	833.3	629.9	3.2	83.1	13.3	16.6	0.0	230.8	0.0
Total	**26,769.2**	**10,737.0**	**381,031.0**	**529.7**	**4,763.6**	**2,901.1**	**116.2**	**402.8**	**33.8**	**659.0**	**1,250.5**	**633.0**	**0.0**

Change in Emissions due to Project

	Annual Emissions (tons per year)												
Source	**VOC**	**NO2**	**CO**	**SO2**	**PM10**	**PM2.5**	**Butadiene**	**Acetaldehyde**	**Acrolein**	**Benzene**	**Ethanol**	**Formaldehyde**	**MTBE**
11	(0.5)	(0.0)	(3.8)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0
21	(6.8)	(0.7)	(89.8)	(0.1)	(0.7)	(0.4)	(0.0)	(0.1)	(0.0)	(0.2)	(0.4)	(0.1)	0.0
31	(9.9)	(2.0)	(160.9)	(0.2)	(1.4)	(0.7)	(0.0)	(0.1)	(0.0)	(0.3)	(0.5)	(0.1)	0.0
32	(3.5)	(1.1)	(58.0)	(0.1)	(0.5)	(0.3)	(0.0)	(0.1)	(0.0)	(0.1)	(0.2)	(0.1)	0.0
42	0.9	1.6	5.4	0.0	0.8	0.7	0.0	0.0	0.0	0.0	0.0	0.1	0.0
51	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0
52	(0.4)	(0.4)	(7.0)	(0.0)	(0.1)	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0
53	(0.0)	(0.0)	(0.5)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0
54	(0.0)	(0.0)	(0.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0
61	(0.6)	(1.5)	(3.4)	(0.0)	(0.6)	(0.5)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	(0.1)	0.0
62	(1.5)	(3.6)	(6.2)	(0.0)	(0.7)	(0.5)	(0.0)	(0.1)	(0.0)	(0.0)	0.0	(0.2)	0.0
Total	**(22.3)**	**(7.7)**	**(324.9)**	**(0.4)**	**(3.3)**	**(1.8)**	**(0.1)**	**(0.3)**	**(0.0)**	**(0.6)**	**(1.1)**	**(0.5)**	**0.0**

Conversions:

453.592	g/lb
2000	lb/ton

Note:

Assumed no change in operation of intercity/transit/school bus other than CTA transit bus on Ashland Ave. Therefore, only CTA buses on Ashland Ave were included in the analysis.

CTA Ashland Ave BRT

2015 Emission Factor by Source Type

	Emission Factor (grams per mile)												
Source	**VOC**	**NO2**	**CO**	**SO2**	**PM10**	**PM2.5**	**Butadiene**	**Acetaldehyde**	**Acrolein**	**Benzene**	**Ethanol**	**Formaldehyde**	**MTBE**
11	1.575	0.026	11.176	0.005	0.058	0.050	0.005	0.011	0.000	0.029	0.120	0.012	0
21	0.317	0.033	4.206	0.005	0.033	0.018	0.001	0.003	0.000	0.008	0.019	0.003	0
31	0.339	0.070	5.530	0.007	0.047	0.025	0.002	0.004	0.000	0.009	0.017	0.004	0
32	0.363	0.109	5.948	0.007	0.054	0.031	0.002	0.005	0.000	0.010	0.016	0.007	0
41	0.337	0.742	1.959	0.013	0.464	0.356	0.001	0.012	0.002	0.003	0	0.029	0
42	0.300	0.536	1.783	0.009	0.275	0.223	0.001	0.011	0.002	0.002	0	0.027	0
43	0.392	0.436	4.008	0.007	0.264	0.187	0.001	0.014	0.002	0.005	0.003	0.032	0
51	0.273	0.632	2.293	0.013	0.290	0.197	0.001	0.009	0.001	0.003	0.002	0.022	0
52	0.470	0.439	8.552	0.010	0.156	0.094	0.002	0.011	0.001	0.010	0.011	0.023	0
53	0.496	0.424	8.281	0.010	0.165	0.103	0.002	0.012	0.002	0.010	0.012	0.024	0
54	0.977	0.428	19.783	0.012	0.140	0.089	0.004	0.015	0.002	0.023	0.046	0.026	0
61	0.274	0.743	1.677	0.015	0.314	0.225	0.001	0.010	0.002	0.002	0	0.026	0
62	0.840	2.023	3.479	0.017	0.409	0.309	0.002	0.041	0.007	0.008	0	0.113	0

CTA Ashland Ave BRT
2015 Emission Factor by Source Type

Vehicle Miles Traveled by Highway Performance Monitoring System (HPMS) Vehicle Types

HPMSVtypeID	yearID	HPMSBaseYearVMT	baseYearOffNetVMT
10	2015	330,538,699	0
20	2015	20,506,768,148	0
30	2015	37,315,994,867	0
40	2015	249,051,927	0
50	2015	895,904,574	0
60	2015	3,661,493,982	0

From CNAA2015.xls.

HPMSVtypeID	CNAA Source Type Fraction	CMAP Source Type Fraction	Daily VMT by Source Type		Annual VMT by Source Type	
			No Build	Build	No Build	Build
10	1%	1%	1,057,887	1,056,971	360,346,108	360,033,949
20	33%	33%	65,631,786	65,574,931	22,356,033,053	22,336,666,570
30	59%	60%	119,429,614	119,326,155	40,681,086,781	40,645,845,754
40	0%	N/A	5,127	12,672	1,871,512	4,625,280
50	1%	1%	2,867,337	2,864,853	976,695,700	975,849,612
60	6%	6%	11,718,589	11,708,438	3,991,681,180	3,988,223,285
TOTAL	100%	100%	200,710,340	200,544,019	68,367,714,334	68,311,244,451

Notes:

Daily VMT calculated from CMAP total daily VMT using default 2015 Chicago Nonattainment Area HPMS source type fraction provided by Illinois EPA.

CMAP total daily VMT does not include vehicle type 40 (bus). Only CTA transit bus on Ashland Ave added to CMAP VMT (assumes all other transit will not change between no build and build).

Annual VMT converted from daily VMT using AADVMT Calculator available at: http://www.epa.gov/otaq/models/moves/tools.htm

Vehicle Miles Traveled by Highway Performance Monitoring System (HPMS) Vehicle Types

MOVESRunID	yearID	sourceTypeID	activityTypeID	total_miles
1	2015	11	1	20,625,778
1	2015	21	1	1,279,633,175
1	2015	31	1	1,744,344,090
1	2015	32	1	584,192,128
1	2015	41	1	6,270,818
1	2015	42	1	2,243,696
1	2015	43	1	7,026,451
1	2015	51	1	1,165,017
1	2015	52	1	49,096,459
1	2015	53	1	3,464,469
1	2015	54	1	2,178,941
1	2015	61	1	122,496,700
1	2015	62	1	105,982,354

From MOVES activity output.

sourceTypeID	CNAA Source Type Fraction	HPMSVtypeID	Fraction by HPMSV Type	Annual VMT by Source Type	
				No Build	Build
11	1%	10	100%	360,346,108	360,033,949
21	33%	20	100%	22,356,033,053	22,336,666,570
31	44%	30	75%	30,474,859,163	30,448,459,541
32	15%	30	25%	10,206,227,618	10,197,386,214
41	0%	40	N/A	N/A	N/A
42	0%	40	100%	1,871,512	4,625,280
43	0%	40	N/A	N/A	N/A
51	0%	50	2%	20,353,631	20,335,999
52	1%	50	88%	857,747,934	857,004,888
53	0%	50	6%	60,526,581	60,474,148
54	0%	50	4%	38,067,554	38,034,577
61	3%	60	54%	2,140,098,900	2,138,244,985
62	3%	60	46%	1,851,582,281	1,849,978,300
TOTAL	100%	N/A	N/A	68,367,714,334	68,311,244,451

CTA Ashland Ave BRT
Chicago Metrolopolitan Agency for Planning Area Vehicle Miles Traveled

No Build

Scenarios	Records (#links)	TimePeriod	Length	Vols	VMT
CMAP□NoBuild□All links	44302	Daily	30,240	312,789,551	200,705,213
CMAP□NoBuild□CentroidConnectorsOnly	3888	Daily	222	36,135,316	2,085,640
CMAP□NoBuild□NoCentroidConnectros	40414	Daily	30,019	276,654,234	198,619,573

Build

Scenarios	Records (#links)	TimePeriod	Length	Vols	VMT
CMAP□CTLR□All links	44302	Daily	30,240	312,485,763	200,531,347
CMAP□CTLR□CentroidConnectorsOnly	3888	Daily	222	36,113,467	2,084,937
CMAP□CTLR□NoCentroidConnectros	40414	Daily	30,019	276,372,295	198,446,410

From VMT calc.xlsx provided by S. Shukla.

CTA Ashland Ave BRT
Source Type Definitions

sourceTypeID	sourceTypeName	HPMSVtypeID	HPMSVtypeName
11	Motorcycle	10	Motorcycles
21	Passenger Car	20	Passenger Cars
31	Passenger Truck	30	Other 2 axle-4 tire vehicles
32	Light Commercial Truck	30	Other 2 axle-4 tire vehicles
41	Intercity Bus	40	Buses
42	Transit Bus	40	Buses
43	School Bus	40	Buses
51	Refuse Truck	50	Single Unit Trucks
52	Single Unit Short-haul Truck	50	Single Unit Trucks
53	Single Unit Long-haul Truck	50	Single Unit Trucks
54	Motor Home	50	Single Unit Trucks
61	Combination Short-haul Truck	60	Combination Trucks
62	Combination Long-haul Truck	60	Combination Trucks

Ashland Avenue BRT
Bus Volumes and Miles Traveled

Summary

		Peak Hour		Daily		Annual	
		Volume	**Miles**	**Volume**	**Miles**	**Volume**	**Miles**
Existing	Local	21	364	291	5,127	106,336	1,871,512
Future	BRT	24	422	576	10,138	210,240	3,700,224
	Local	6	106	144	2,534	52,560	925,056
	Total	30	528	720	12,672	262,800	4,625,280

Route Length 17.6 mi

Without Project

	Headway (min)	Daily Volume	Miles
AM Peak	5.8	41	728
Mid-Day	8.7	41	728
PM Peak	6.8	35	621
Eve	15	16	282
Owl	31	12	204

				Daily		Peak Hour	
	Time	**Hours**	**Minutes**	**Volume**	**Miles**	**Volume**	**Miles**
AM Peak	05:00-09:00	4	240	41	728	10	182
Mid-Day	09:00-15:00	6	360	41	728	7	121
PM Peak	15:00-19:00	4	240	35	621	9	155
Eve	19:00-22:00	4	240	16	282	4	70
Owl	22:00-04:00	6	360	12	204	2	34

Total	**one-way**			146	2,564	10	182
	roundtrip	24	1,440	291	5,127	21	364

With Project

Rapid Bus Service

Headway 5 min

		Each way		Both ways	
	Minutes	**Volume**	**Miles**	**Volume**	**Miles**
Hour	60	12	211	24	422
Day	1,440	288	5,069	576	10,138
Year	525,600	105,120	1,850,112	210,240	3,700,224

Local

Headway 20 min

			Each way		Both ways	
	Hours	**Minutes**	**Volume**	**Miles**	**Volume**	**Miles**
Hour	1	60	3	53	6	106
Day	24	1,440	72	1,267	144	2,534
Year	8,760	525,600	26,280	462,528	52,560	925,056

Source: Operational information from "Draft Cost & Revenue Impacts of Ashland Ave. BRT Treatments.'

CTA Ashland Ave BRT
CO Hotspots Analysis

Maximum 1-Hour CO Concentrations (ppm)

	1001 - Irving		1011 - Belmont		1018 - Diversey		1094 - Roosevelt		1109 - Cermak	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
No Build	5.5	5.4	5.6	5.4	5.6	5.5	6.1	6.8	5.5	5.4
Build	5.5	5.7	6.5	6.3	6.4	6.5	6.1	7.0	6.1	5.9
NAAQS	35	35	35	35	35	35	35	35	35	35
Exceed NAAQS?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Maximum 8-Hour CO Concentrations (ppm)

	1001 - Irving		1011 - Belmont		1018 - Diversey		1094 - Roosevelt		1109 - Cermak	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
No Build	3.9	3.8	3.9	3.8	3.9	3.9	4.3	4.8	3.9	3.8
Build	3.9	4.0	4.6	4.4	4.5	4.6	4.3	4.9	4.3	4.1
NAAQS	9	9	9	9	9	9	9	9	9	9
Exceed NAAQS?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Persistence Factor 0.7 *(1992 CO Hotspot Guidance)*

Ashland With Project Intersection LOS and Delay Summary

ID	Location	AM LOS	AM Avg Delay(s)	AM Entering Vehicles	AM Delay (veh-hrs)	PM LOS	PM Avg Delay(s)	PM Entering Vehicles	PM Delay (veh-hrs)
1001	W Irving Park Rd.	F	106.9	3,946	7,030	F	105.1	3,944	6,909
1003	W Grace St.	C	30.5	1,684	856	C	23.8	1,737	689
1005	W Addison St.	F	103.9	2,734	4,734	F	92	2,789	4,276
1007	W Roscoe St.	D	53.4	1,557	1,386	C	27.8	1,577	731
1009	W School St.	C	29.1	1,678	814	D	36.6	1,809	1,103
1011	W Belmont Ave./ N. Lincoln Ave.	F	190.3	3,258	10,333	F	173.9	3,286	9,524
1012	W Barry Ave.	C	24.6	1,690	693	E	57.3	1,987	1,898
1014	W Wellington Ave.	C	22	1,454	533	C	32.2	1,994	1,070
1018	W Diversey Pkwy.	F	247.8	3,485	14,393	F	320.4	3,895	20,799
1019	W Wrightwood Ave.	D	53.3	2,065	1,834	E	68.9	2,300	2,641
1023	W Fullerton Ave.	D	52.5	2,717	2,377	F	124.3	3,516	7,284
1024	N Clybourn Ave.	E	72.2	2,643	3,180	F	118.1	3,238	6,373
1025	W Webster Ave.	C	28.8	2,162	1,038	E	80	2,746	3,661
1026	N Elston Ave.	E	67.2	2,427	2,718	D	37.1	2,713	1,678
1027	W Armitage Ave.	C	33.7	2,239	1,258	E	63.1	2,511	2,641
1029	W Cortland St.	C	33.7	1,618	909	C	34.7	1,796	1,039
1030	W Wabansia Ave.	B	16.4	1,206	330	B	11.8	1,499	295
1033	W North Ave.	E	79	2,796	3,681	F	104.6	3,162	5,512
1039	W Blackhawk St.	C	20.5	1,491	509	B	17.6	1,657	486
1042	N Milwaukee Ave.	C	29.2	1,859	905	D	36.8	2,275	1,395
1043	W Division St.	C	22.8	2,722	1,034	D	46.4	3,036	2,348
1049	W Augusta Blvd.	C	29.2	2,097	1,021	F	95.1	2,656	4,210
1056	W Chicago Ave.	C	21.8	2,612	949	D	38.6	2,989	1,923
1062	W Erie St.	B	12.8	1,369	292	B	16	1,632	435
1066	W Grand Ave.	D	43.1	2,901	2,084	D	45.9	2,960	2,264
1073	W Fulton St. (West)	A	8.8	1,109	163	B	12.7	1,378	292
1074	W Fulton St. (East)	A	4	1,107	74	A	7.8	1,419	184
1077	W Lake St.	C	28.3	1,711	807	C	30.1	2,028	1,017
1079	W Washington Blvd.	B	10.9	1,529	278	B	10.4	1,627	282
1080	W Warren Blvd.	B	16.2	1,721	465	B	13.2	1,660	365
1082	W Madison St.	B	16.5	1,798	494	C	23.1	3,366	1,296
1083	W Ogden Ave.	C	23.6	2,730	1,074	B	18	2,826	848
1084	W Monroe St.	C	20.3	1,507	510	B	13.4	1,290	288
1085	W Adams St.	C	34.2	1,670	952	B	16.1	1,549	416
1086	W Jackson Blvd.	B	19.7	1,854	609	B	18.3	2,123	648
1088	W Van Buren St.	C	27.1	2,923	1,320	C	21	2,674	936
1089	W Congress Pkwy	C	21.3	2,714	963	C	20.1	2,717	910
1090	W Harrison St.	C	21.3	3,189	1,132	C	20.6	3,209	1,102
1091	W Flournoy St.	A	6.6	2,048	225	B	12.3	2,080	426
1092	W Polk St.	B	18.1	2,127	642	C	22.8	2,187	831
1093	W Taylor St.	B	17.6	1,980	581	B	17.9	2,341	698
1094	W Roosevelt Rd.	F	197.1	5,263	17,289	F	217.7	5,395	19,575
1096	W 13th St.	B	10.4	1,279	222	F	81.4	2,067	2,804
1098	W 14th St.	B	16	1,205	321	C	22.7	1,515	573
1103	W 18th St.	D	41.9	2,158	1,507	D	49.2	2,610	2,140

ID	Location	AM LOS	AM Avg Delay(s)	AM Entering Vehicles	AM Delay (veh-hrs)	PM LOS	PM Avg Delay(s)	PM Entering Vehicles	PM Delay (veh-hrs)
1105	W 19th St.	C	30.7	1,860	952	B	18.9	1,851	583
1107	W 21st St.	C	30.1	1,809	908	C	26.8	1,902	850
1109	W Cermak Rd.	F	203.8	3,143	10,676	F	171.5	2,962	8,466
1110	2451 S Ashland Ave.	A	2.5	1,380	58	A	2.2	1,604	59
1111	W 27th St.	A	1.5	1,433	36	A	0.9	1,581	24
1112	W Marketplace Access Rd.	B	10.3	1,395	239	A	8.3	1,445	200
1113	W 31st Pl.	C	26.2	1,757	767	C	23.1	1,626	626
1114	S Archer Ave.	C	26.3	3,014	1,321	C	27.1	3,490	1,576
1115	W Robinson St.	B	15.4	1,100	282	B	18.4	1,356	416
1118	W 33rd St.	B	12.5	731	152	B	12.4	1,086	224
1121	W 35th St.	C	22.6	1,510	569	C	26.5	2,087	922
1123	W 37th St.	B	11.8	1,221	240	A	7.2	1,153	138
1127	W Pershing Rd.	C	25	2,056	857	C	20.4	2,256	767
1130	W 42nd St. (West)	A	9.6	997	160	A	8	1,117	149
1131	W 42nd Pl.	A	5.2	1,103	96	A	4.8	769	62
1132	W 43rd St.	C	23.3	1,512	587	C	22.1	1,655	610
1133	W 44th St.	A	9.8	1,223	200	A	9	915	137
1134	W 45th St.	B	12.1	972	196	B	13.2	908	200
1135	W 46th St.	B	12.9	999	215	B	14.4	1,033	248
1136	W 47th St./ S. McDowell Ave.	C	24.8	1,608	665	C	20.9	1,812	631
1137	W 48th St.	B	13	1,001	217	D	52.7	1,102	968
1138	W 49th St.	B	13	876	190	A	9.8	944	154
1139	W 50th St.	B	12.9	870	187	B	13.3	846	188
1140	W 51st St.	C	22.4	1,397	522	C	21.4	1,456	519
1142	W 53rd St.	A	6.4	699	75	B	15	776	194
1144	W Garfield Blvd. (WB)	C	27.6	1,597	735	C	33.1	1,790	987
1145	W Garfield Blvd. (EB)	D	49	1,891	1,544	C	25.9	1,781	769
1148	W 57th St.	A	9.4	927	145	B	10.2	867	147
1150	W 59th St.	C	26.4	1,647	725	C	24.8	1,881	777
1152	W 61st St.	B	15.2	1,073	272	B	17.2	1,005	288
1154	W 63rd St.	C	27.2	2,212	1,003	E	71.8	2,316	2,771
1156	W 65th St.	A	8.3	997	138	A	6.9	942	108
1158	W Marquette Rd.	C	29.4	1,715	840	C	34.8	1,936	1,123
1160	W 69th St.	C	25.1	1,603	671	D	42	1,724	1,207
1162	W 71st St.	C	27.5	1,781	816	C	27.3	2,071	942
1168	W 74th St.	B	15.9	1,412	374	C	21.2	1,654	584
1170	W 76th St.	B	17.2	1,504	431	C	24.8	1,725	713
1173	W 79th St.	D	37.6	1,973	1,236	E	69.4	2,101	2,430
1175	W 81st St.	B	16.6	958	265	D	42.1	1,293	907
1177	W 83rd St.	B	18.8	1,684	528	D	42.3	2,221	1,566
1179	W 85th St.	B	15.8	1,151	303	B	16.1	1,251	336
1181	W 87th St.	D	46.8	3,365	2,625	E	77.2	3,574	4,599
1185	W 91st St.	B	16.3	1,255	341	B	16.7	1,236	344
1191	W 95th St.	D	41.3	2,762	1,901	D	35.2	2,969	1,742

Top 20 Intersections by Volume
Future Build Conditions

Sorted by Volume

AM Peak	ID	Location	AM LOS	AM Avg Delay (s)	AM Entering Vehicles
1	1094	W Roosevelt Rd.	F	197.1	5263
2	1001	W Irving Park Rd.	F	106.9	3946
3	1018	W Diversey Pkwy.	F	247.8	3485
4	1181	W 87th St.	D	46.8	3365
5	1011	W Belmont Ave./ N. Lincoln Ave.	F	190.3	3258
6	1090	W Harrison St.	C	21.3	3189
7	1109	W Cermak Rd.	F	203.8	3143
8	1114	S Archer Ave.	C	26.3	3014
9	1088	W Van Buren St.	C	27.1	2923
10	1066	W Grand Ave.	D	43.1	2901
11	1033	W North Ave.	E	79	2796
12	1191	W 95th St.	D	41.3	2762
13	1005	W Addison St.	F	103.9	2734
14	1083	W Ogden Ave.	C	23.6	2730
15	1043	W Division St.	C	22.8	2722
16	1023	W Fullerton Ave.	D	52.5	2717
17	1089	W Congress Pkwy	C	21.3	2714
18	1024	N Clybourn Ave.	E	72.2	2643
19	1056	W Chicago Ave.	C	21.8	2612
20	1026	N Elston Ave.	E	67.2	2427

Sorted by LOS/Delay

AM Peak	ID	Location	AM LOS	AM Avg Delay (s)	AM Entering Vehicles
3	1018	W Diversey Pkwy.	F	247.8	3485
7	1109	W Cermak Rd.	F	203.8	3143
1	1094	W Roosevelt Rd.	F	197.1	5263
5	1011	W Belmont Ave./ N. Lincoln Ave.	F	190.3	3258
2	1001	W Irving Park Rd.	F	106.9	3946
13	1005	W Addison St.	F	103.9	2734
11	1033	W North Ave.	E	79	2796
18	1024	N Clybourn Ave.	E	72.2	2643
20	1026	N Elston Ave.	E	67.2	2427
16	1023	W Fullerton Ave.	D	52.5	2717
4	1181	W 87th St.	D	46.8	3365
10	1066	W Grand Ave.	D	43.1	2901
12	1191	W 95th St.	D	41.3	2762
9	1088	W Van Buren St.	C	27.1	2923
8	1114	S Archer Ave.	C	26.3	3014
14	1083	W Ogden Ave.	C	23.6	2730
15	1043	W Division St.	C	22.8	2722
19	1056	W Chicago Ave.	C	21.8	2612
6	1090	W Harrison St.	C	21.3	3189
17	1089	W Congress Pkwy	C	21.3	2714

Sorted by Volume

PM Peak	ID	Location	PM LOS	PM Avg Delay (s)	PM Entering Vehicles
1	1094	W Roosevelt Rd.	F	217.7	5395
2	1001	W Irving Park Rd.	F	105.1	3944
3	1018	W Diversey Pkwy.	F	320.4	3895
4	1181	W 87th St.	E	77.2	3574
5	1023	W Fullerton Ave.	F	124.3	3516
6	1114	S Archer Ave.	C	27.1	3490
7	1082	W Madison St.	C	23.1	3366
8	1011	W Belmont Ave./ N. Lincoln Ave.	F	173.9	3286
9	1024	N Clybourn Ave.	F	118.1	3238
10	1090	W Harrison St.	C	20.6	3209
11	1033	W North Ave.	F	104.6	3162
12	1043	W Division St.	D	46.4	3036
13	1056	W Chicago Ave.	D	38.6	2989
14	1191	W 95th St.	D	35.2	2969
15	1109	W Cermak Rd.	F	171.5	2962
16	1066	W Grand Ave.	D	45.9	2960
17	1083	W Ogden Ave.	B	18	2826
18	1005	W Addison St.	F	92	2789
19	1025	W Webster Ave.	E	80	2746
20	1089	W Congress Pkwy	C	20.1	2717

Sorted by LOS/Delay

PM Peak	ID	Location	PM LOS	PM Avg Delay (s)	PM Entering Vehicles
3	1018	W Diversey Pkwy.	F	320.4	3895
1	1094	W Roosevelt Rd.	F	217.7	5395
8	1011	W Belmont Ave./ N. Lincoln Ave.	F	173.9	3286
15	1109	W Cermak Rd.	F	171.5	2962
5	1023	W Fullerton Ave.	F	124.3	3516
9	1024	N Clybourn Ave.	F	118.1	3238
2	1001	W Irving Park Rd.	F	105.1	3944
11	1033	W North Ave.	F	104.6	3162
18	1005	W Addison St.	F	92	2789
19	1025	W Webster Ave.	E	80	2746
4	1181	W 87th St.	E	77.2	3574
12	1043	W Division St.	D	46.4	3036
16	1066	W Grand Ave.	D	45.9	2960
13	1056	W Chicago Ave.	D	38.6	2989
14	1191	W 95th St.	D	35.2	2969
6	1114	S Archer Ave.	C	27.1	3490
7	1082	W Madison St.	C	23.1	3366
10	1090	W Harrison St.	C	20.6	3209
20	1089	W Congress Pkwy	C	20.1	2717
17	1083	W Ogden Ave.	B	18	2826

Intersections Selected for Screening

W Belmont Ave./ N. Lincoln Ave.
W Cermak Rd.
W Diversey Pkwy.
W Irving Park Rd.
W Roosevelt Rd.

Note: Top 3 intersections from each table sorted and duplicates removed to make final selection.

CTA Ashland Ave BRT
Intersection 1011: W Belmont Ave / N Lincoln Ave
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection End Point
	1079	N-FA (Ashland)	W Barry Ave
NBT	920	N-TQ (N Ashland)	
	1022	N-FD (Ashland)	W School St
NBL	67	N-LQ (NW Lincoln)	
NBL2	2	N-LQ2 (W Belmont)	
NBR	88	N-RQ (E Belmont)	
NBR2	2	N-RQ2 (SE Lincoln)	
	1120	S-FA (Ashland)	W School St
SBT	1004	S-TQ (S Ashland)	
	1167	S-FD (Ashland)	W Barry Ave
SBL	83	S-LQ (SE Lincoln)	
SBL2	19	S-LQ2 (E Belmont)	
SBR	14	S-RQ (W Belmont)	
	415	W-FA (Belmont)	N Greenview Ave
WBT	238	W-TQ (W Belmont)	
	273	W-FD (Belmont)	N Paulina St
WBR	143	W-RQ (NW Lincoln)	
WBR2	34	W-RQ2 (N Ashland)	
	527	E-FA (Belmont)	N Paulina St
EBT	376	E-TQ (E Belmont)	
	520	E-FD (Belmont)	N Greenview Ave
EBL2	3	E-LQ2 (NW Lincoln)	
EBR	105	E-RQ (SE Lincoln)	
EBR2	43	E-RQ2 (S Ashland)	
	491	SE-FA (Lincoln)	W School St
SET	343	SE-TQ (SE Lincoln)	
	533	SE-FD (Lincoln)	W Barry Ave
SEL	35	SE-LQ (E Belmont)	
SER	111	SE-RQ (S Ashland)	
SER2	2	SE-RQ2 (W Belmont)	
	350	NW-FA (Lincoln)	W Barry Ave
NWT	254	NW-TQ (NW Lincoln)	
	467	NW-FD (Lincoln)	W School St
NWL	17	NW-LQ (W Belmont)	
NWL2	9	NW-LQ2 (S Ashland)	
NWR	68	NW-RQ (N Ashland)	
NWR2	2	NW-RQ2 (E Belmont)	
Total Volume	3962	(excluding buses)	

Data Sources:
Volumes □Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

MOVES Link Importer (AM Peak) 1011 W Belmont Ave □N Lincoln Ave 7:30 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.13	1079	5.9	N-FA (Ashland)	0	
2	17031	170310	5	0.13	920	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.13	1022	5.9	N-FD (Ashland)	0	
4	17031	170310	5	0.13	69	0	N-LQ (NW Lincoln)	0	Includes NBL, NBL2
5	17031	170310	5	0.13	90	0	N-RQ (E Belmont)	0	Includes NBR, NBR2
6	17031	170310	5	0.13	1120	4.9	S-FA (Ashland)	0	
7	17031	170310	5	0.13	1018	0	S-TQ (S Ashland)	0	Includes SBT, SBR
8	17031	170310	5	0.13	1167	4.9	S-FD (Ashland)	0	
9	17031	170310	5	0.13	102	0	S-LQ (SE Lincoln)	0	Includes SBL, SBL2
10	17031	170310	5	0.12	415	8	W-FA (Belmont)	0	
11	17031	170310	5	0.12	238	0	W-TQ (W Belmont)	0	
12	17031	170310	5	0.13	273	8	W-FD (Belmont)	0	
13	17031	170310	5	0.12	177	0	W-RQ (NW Lincoln)	0	Includes WBR, WBR2
14	17031	170310	5	0.13	527	2.1	E-FA (Belmont)	0	
15	17031	170310	5	0.13	527	0	E-TQ (E Belmont)	0	Includes EBT, EBL2, EBR, EBR2
16	17031	170310	5	0.12	520	2.1	E-FD (Belmont)	0	
17	17031	170310	5	0.15	491	3.1	SE-FA (Lincoln)	0	
18	17031	170310	5	0.15	456	0	SE-TQ (SE Lincoln)	0	Includes SET, SER, SER2
19	17031	170310	5	0.18	533	3.1	SE-FD (Lincoln)	0	
20	17031	170310	5	0.15	35	0	SE-LQ (E Belmont)	0	
21	17031	170310	5	0.18	350	6.7	NW-FA (Lincoln)	0	
22	17031	170310	5	0.18	324	0	NW-TQ (NW Lincoln)	0	Includes NWT, NWR, NWR2
23	17031	170310	5	0.15	467	6.7	NW-FD (Lincoln)	0	
24	17031	170310	5	0.18	26	0	NW-LQ (W Belmont)	0	Includes NWL, NWL2
				Total Volume	3962	(excluding buses)			

Legend
▨ Estimated queue length
▨ Contains bus volume
Calculated Value

Local Buses
10

	Volume	Fraction
Cars	3675	0.9252266
Trucks	287	0.0722558
Buses	10	0.0025176
Total	3972	1
	ok	

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005258914	0.005271603
Cars	21	0.326265346	0.32705261
Cars	31	0.445276745	0.446351179
Cars	32	0.148425582	0.148783726
Buses	41	0	0
Buses	42	0.002517623	0
Buses	43	0	0
Trucks	51	0.000142322	0.000142884
Trucks	52	0.010816471	0.010859148
Trucks	53	0.000853932	0.000857301
Trucks	54	0.002277152	0.002286136
Trucks	61	0.030827935	0.030949568
Trucks	62	0.02733798	0.027445843
	Total	1	1

CTA Ashland Ave BRT
Intersection 1011: W Belmont Ave / N Lincoln Ave
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection End Point
	1146	N-FA (Ashland)	W Barry Ave
NBT	954	N-TQ (N Ashland)	
	1119	N-FD (Ashland)	W School St
NBL	78	N-LQ (NW Lincoln)	
NBL2	16	N-LQ2 (W Belmont)	
NBR	97	N-RQ (E Belmont)	
NBR2	1	N-RQ2 (SE Lincoln)	
	1002	S-FA (Ashland)	W School St
SBT	862	S-TQ (S Ashland)	
	1006	S-FD (Ashland)	W Barry Ave
SBL	79	S-LQ (SE Lincoln)	
SBL2	24	S-LQ2 (E Belmont)	
SBR	33	S-RQ (W Belmont)	
SBR2	4	S-RQ2 (NW Lincoln)	
	534	W-FA (Belmont)	N Greenview Ave
WBT	310	W-TQ (W Belmont)	
	401	W-FD (Belmont)	N Paulina St
WBL	5	W-LQ (S Ashland)	
WBR	149	W-RQ (NW Lincoln)	
WBR2	70	W-RQ2 (N Ashland)	
	442	E-FA (Belmont)	N Paulina St
EBT	353	E-TQ (E Belmont)	
	526	E-FD (Belmont)	N Greenview Ave
EBL	1	E-LQ (N Ashland)	
EBL2	1	E-LQ2 (NW Lincoln)	
EBR	58	E-RQ (SE Lincoln)	
EBR2	29	E-RQ2 (S Ashland)	
	397	SE-FA (Lincoln)	W School St
SET	243	SE-TQ (SE Lincoln)	
	381	SE-FD (Lincoln)	W Barry Ave
SEL	45	SE-LQ (E Belmont)	
SEL2	3	SE-LQ2 (N Ashland)	
SER	95	SE-RQ (S Ashland)	
SER2	11	SE-RQ2 (W Belmont)	
	410	NW-FA (Lincoln)	W Barry Ave
NWT	266	NW-TQ (NW Lincoln)	
	498	NW-FD (Lincoln)	W School St
NWL	31	NW-LQ (W Belmont)	
NWL2	15	NW-LQ2 (S Ashland)	
NWR	91	NW-RQ (N Ashland)	
NWR2	7	NW-RQ2 (E Belmont)	
Total Volume	3913	(excluding buses)	

MOVES Link Importer (PM Peak) 1011 W Belmont Ave □N Lincoln Ave 5:00 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.13	1146	4	N-FA (Ashland)	0	
2	17031	170310	5	0.13	954	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.13	1119	4	N-FD (Ashland)	0	
4	17031	170310	5	0.13	94	0	N-LQ (NW Lincoln)	0	Includes NBL, NBL2
5	17031	170310	5	0.13	98	0	N-RQ (E Belmont)	0	Includes NBR, NBR2
6	17031	170310	5	0.13	1002	5.8	S-FA (Ashland)	0	
7	17031	170310	5	0.13	899	0	S-TQ (S Ashland)	0	Includes SBT, SBR, SBR2
8	17031	170310	5	0.13	1006	5.8	S-FD (Ashland)	0	
9	17031	170310	5	0.13	103	0	S-LQ (SE Lincoln)	0	Includes SBL, SBL2
10	17031	170310	5	0.12	534	5.9	W-FA (Belmont)	0	
11	17031	170310	5	0.12	315	0	W-TQ (W Belmont)	0	Includes WBT, WBL
12	17031	170310	5	0.13	401	5.9	W-FD (Belmont)	0	
13	17031	170310	5	0.12	219	0	W-RQ (NW Lincoln)	0	Includes WBR2
14	17031	170310	5	0.13	442	4	E-FA (Belmont)	0	
15	17031	170310	5	0.13	442	0	E-TQ (E Belmont)	0	Includes EBL2, EBL, EBT, EBR, EBR2
16	17031	170310	5	0.12	526	4	E-FD (Belmont)	0	
17	17031	170310	5	0.15	397	6	SE-FA (Lincoln)	0	
18	17031	170310	5	0.15	349	0	SE-TQ (SE Lincoln)	0	Includes SET, SER, SER2
19	17031	170310	5	0.18	381	6	SE-FD (Lincoln)	0	
20	17031	170310	5	0.15	48	0	SE-LQ (E Belmont)	0	Includes SEL, SEL2
21	17031	170310	5	0.18	410	5.7	NW-FA (Lincoln)	0	
22	17031	170310	5	0.18	364	0	NW-TQ (NW Lincoln)	0	Includes NWT, NWR, NWR2
23	17031	170310	5	0.15	498	5.7	NW-FD (Lincoln)	0	
24	17031	170310	5	0.18	46	0	NW-LQ (W Belmont)	0	Includes NWL, NWL2
				Total Volume	3913	(excluding buses)			

Legend

▨	Estimated queue length
🟨	Link not included in AM peak hour
🟧	Contains bus volume
	Calculated Value

Local Buses
9

	Volume	Fraction
Cars	3629	0.9252932
Trucks	284	0.072412
Buses	9	0.0022947
Total	3922	1
	ok	

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005259292	0.005271603
Cars	21	0.326288842	0.32705261
Cars	31	0.445308812	0.446351179
Cars	32	0.148436271	0.148783726
Buses	41	0	0
Buses	42	0.002294748	0
Buses	43	0	0
Trucks	51	0.00014263	0.000142884
Trucks	52	0.01083986	0.010859148
Trucks	53	0.000855778	0.000857301
Trucks	54	0.002282076	0.002286136
Trucks	61	0.030894596	0.030949568
Trucks	62	0.027397095	0.027445843
	Total	1	1

Data Sources:
Volumes □Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (e.g., N-FA □N-TQ □N-LQ □N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffic (e.g., N-FD □N-TQ □E-LQ □W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1109: W Cermak Rd
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	1397	N-FA (Ashland)	S Archer Ave
NBT	1114	N-TQ (N Ashland)	
	1488	N-FD (Ashland)	W 21st Pl
NBL	101	N-LQ (W Cermak)	
NBL2	29	N-LQ2 (SW Blue Island)	
NBR	153	N-RQ (E Cermak)	
	820	S-FA (Ashland)	W 21st Pl
SBT	611	S-TQ (S Ashland)	
	788	S-FD (Ashland)	S Archer Ave
SBL	42	S-LQ (E Cermak)	
SBR	135	S-RQ (SW Blue Island)	
SBR2	32	S-RQ2 (W Cermak)	
	586	W-FA (Cermak)	S Laflin St
WBT	298	W-TQ (W Cermak)	
	431	W-FD (Cermak)	S Paulina St
WBL	93	W-LQ (SW Blue Island)	
WBL2	91	W-LQ2 (S Ashland)	
WBR	104	W-RQ (N Ashland)	
	403	E-FA (Cermak)	S Paulina St
EBT	278	E-TQ (E Cermak)	
	665	E-FD (Cermak)	S Laflin St
EBL	74	E-LQ (N Ashland)	
EBR	51	E-RQ (S Ashland)	
	423	NE-FA (Blue Island)	S Paulina St
NEL	196	NE-LQ (N Ashland)	
NER	192	NE-RQ (E Cermak)	
NER2	35	NE-RQ2 (S Ashland)	
	257	SW-FD (Blue Island)	S Paulina St
Total Volume	3609	(excluding buses)	

Data Sources:

Volumes □ Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf

Ashland Avenue Arterial Speeds □ Ashland AM Arterial LOS 2013-05-02.pdf

Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

MOVES Link Importer (AM Peak) 1109 W Cermak Rd 7:15 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	1.01	1397	12.6	N-FA (Ashland)	0	
2	17031	170310	5	1.01	1114	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.12	1488	12.6	N-FD (Ashland)	0	
4	17031	170310	5	1.01	130	0	N-LQ (W Cermak)	0	Includes NBL, NBL2
5	17031	170310	5	1.01	153	0	N-RQ (E Cermak)	0	
6	17031	170310	5	0.12	820	9.3	S-FA (Ashland)	0	
7	17031	170310	5	0.12	611	0	S-TQ (S Ashland)	0	
8	17031	170310	5	1.01	788	9.3	S-FD (Ashland)	0	
9	17031	170310	5	0.12	42	0	S-LQ (E Cermak)	0	
10	17031	170310	5	0.12	167	0	S-RQ (SW Blue Island)	0	Includes SBR, SBR2
11	17031	170310	5	0.12	586	8.1	W-FA (Cermak)	0	
12	17031	170310	5	0.12	402	0	W-TQ (W Cermak)	0	Includes WBT, WBR
13	17031	170310	5	0.13	431	8.1	W-FD (Cermak)	0	
14	17031	170310	5	0.12	184	0	W-LQ (SW Blue Island)	0	Includes WBL, WBL2
15	17031	170310	5	0.13	403	5.7	E-FA (Cermak)	0	
16	17031	170310	5	0.13	329	0	E-TQ (E Cermak)	0	Includes EBT, EBR
17	17031	170310	5	0.12	665	5.7	E-FD (Cermak)	0	
18	17031	170310	5	0.13	74	0	E-LQ (N Ashland)	0	
19	17031	170310	5	0.14	423	4.2	NE-FA (Blue Island)	0	
20	17031	170310	5	0.14	196	0	NE-LQ (N Ashland)	0	
21	17031	170310	5	0.14	227	0	NE-RQ (E Cermak)	0	Includes NER, NER2
22	17031	170310	5	0.14	257	4.2	SW-FD (Blue Island)	0	
				Total Volume	3609	(excluding buses)			

Legend

▒ Estimated queue length

🟧 Contains bus volume

Calculated Value

Local Buses

10

	Volume	Fraction
Cars	3347	0.9248411
Trucks	262	0.0723957
Buses	10	0.0027632
Total	3619	1
	ok	

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005256723	0.005271603
Cars	21	0.326129416	0.32705261
Cars	31	0.445091233	0.446351179
Cars	32	0.148363744	0.148783726
Buses	41	0	0
Buses	42	0.002763194	0
Buses	43	0	0
Trucks	51	0.000142598	0.000142884
Trucks	52	0.010837413	0.010859148
Trucks	53	0.000855585	0.000857301
Trucks	54	0.002281561	0.002286136
Trucks	61	0.030887622	0.030949568
Trucks	62	0.02739091	0.027445843
	Total	1	1

CTA Ashland Ave BRT
Intersection 1109: W Cermak Rd
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	950	N-FA (Ashland)	S Archer Ave
NBT	765	N-TQ (N Ashland)	
	987	N-FD (Ashland)	W 21st Pl
NBL	61	N-LQ (W Cermak)	
NBL2	33	N-LQ2 (SW Blue Island)	
NBR	91	N-RQ (E Cermak)	
	1393	S-FA (Ashland)	W 21st Pl
SBT	1112	S-TQ (S Ashland)	
	1327	S-FD (Ashland)	S Archer Ave
SBL	67	S-LQ (E Cermak)	
SBR	152	S-RQ (SW Blue Island)	
SBR2	62	S-RQ2 (W Cermak)	
	641	W-FA (Cermak)	S Laflin St
WBT	346	W-TQ (W Cermak)	
	473	W-FD (Cermak)	S Paulina St
WBL	172	W-LQ (SW Blue Island)	
WBL2	84	W-LQ2 (S Ashland)	
WBR	39	W-RQ (N Ashland)	
	405	E-FA (Cermak)	S Paulina St
EBT	242	E-TQ (E Cermak)	
	567	E-FD (Cermak)	S Laflin St
EBL	81	E-LQ (N Ashland)	
EBR	82	E-RQ (S Ashland)	
	322	NE-FA (Blue Island)	S Paulina St
NEL	102	NE-LQ (N Ashland)	
NEL2	4	NE-LQ2 (W Cermak)	
NER	167	NE-RQ (E Cermak)	
NER2	49	NE-RQ2 (S Ashland)	
	357	SW-FD (Blue Island)	S Paulina St
Total Volume	3693	(excluding buses)	

MOVES Link Importer (PM Peak) 1109 W Cermak Rd 4:30 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	1.01	950	14.6	N-FA (Ashland)	0	
2	17031	170310	5	1.01	765	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.12	987	14.6	N-FD (Ashland)	0	
4	17031	170310	5	1.01	94	0	N-LQ (W Cermak)	0	Includes NBL, NBL2
5	17031	170310	5	1.01	91	0	N-RQ (E Cermak)	0	
6	17031	170310	5	0.12	1393	7	S-FA (Ashland)	0	
7	17031	170310	5	0.12	1112	0	S-TQ (S Ashland)	0	
8	17031	170310	5	1.01	1327	7	S-FD (Ashland)	0	
9	17031	170310	5	0.12	67	0	S-LQ (E Cermak)	0	
10	17031	170310	5	0.12	214	0	S-RQ (SW Blue Island)	0	Includes SBR, SBR2
11	17031	170310	5	0.12	641	7.9	W-FA (Cermak)	0	
12	17031	170310	5	0.12	385	0	W-TQ (W Cermak)	0	Includes WBT, WBR
13	17031	170310	5	0.13	473	7.9	W-FD (Cermak)	0	
14	17031	170310	5	0.12	256	0	W-LQ (SW Blue Island)	0	Includes WBL, WBL2
15	17031	170310	5	0.13	405	5.6	E-FA (Cermak)	0	
16	17031	170310	5	0.13	324	0	E-TQ (E Cermak)	0	Includes EBT, EBR
17	17031	170310	5	0.12	567	5.6	E-FD (Cermak)	0	
18	17031	170310	5	0.13	81	0	E-LQ (N Ashland)	0	
19	17031	170310	5	0.14	322	5.7	NE-FA (Blue Island)	0	
20	17031	170310	5	0.14	106	0	NE-LQ (N Ashland)	0	Includes NEL, NEL2
21	17031	170310	5	0.14	216	0	NE-RQ (E Cermak)	0	Includes NER, NER2
22	17031	170310	5	0.14	357	5.7	SW-FD (Blue Island)	0	
				Total Volume	3693	(excluding buses)			

Legend

▨	Estimated queue length
🟨	Link not included in AM peak hour
🟧	Contains bus volume
Calculated Value	

Local Buses
9

	Volume	Fraction
Cars	3425	0.9251756
Trucks	268	0.0723933
Buses	9	0.0024311
Total	3702	1
	ok	

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005258624	0.005271603
Cars	21	0.32624736	0.32705261
Cars	31	0.445252198	0.446351179
Cars	32	0.148417399	0.148783726
Buses	41	0	0
Buses	42	0.002431118	0
Buses	43	0	0
Trucks	51	0.000142593	0.000142884
Trucks	52	0.010837056	0.010859148
Trucks	53	0.000855557	0.000857301
Trucks	54	0.002281485	0.002286136
Trucks	61	0.030886603	0.030949568
Trucks	62	0.027390007	0.027445843
	Total	1	1

Data Sources:
Volumes □Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA □N-TQ □N-LQ □N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD □N-TQ □E-LQ □W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1018: W Diversey Pkwy
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	1106	N-FA (Ashland)	W Wrightwood Ave
NBT	978	N-TQ (N Ashland)	
	1226	N-FD (Ashland)	W Wolfram St
NBL	12	N-LQ (W Diversey)	
NBR	116	N-RQ (E Diversey)	
	2030	S-FA (Ashland)	W Wolfram St
SBT	1848	S-TQ (S Ashland)	
	2055	S-FD (Ashland)	W Wrightwood Ave
SBL	80	S-LQ (E Diversey)	
SBR	102	S-RQ (W Diversey)	
	645	W-FA (Diversey)	N Greenview Ave
WBT	449	W-TQ (W Diversey)	
	563	W-FD (Diversey)	N Paulina St
WBL	132	W-LQ (S Ashland)	
WBR	64	W-RQ (N Ashland)	
	942	E-FA (Diversey)	N Paulina St
EBT	683	E-TQ (E Diversey)	
	879	E-FD (Diversey)	N Greenview Ave
EBL	184	E-LQ (N Ashland)	
EBR	75	E-RQ (S Ashland)	
Total Volume	4703	(excluding buses)	

MOVES Link Importer (AM Peak) 1018 W Diversey Pkwy 7:15 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.25	1106	19.9	N-FA (Ashland)	0	
2	17031	170310	5	0.25	978	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.06	1226	19.9	N-FD (Ashland)	0	
4	17031	170310	5	0.25	12	0	N-LQ (W Diversey)	0	
5	17031	170310	5	0.25	116	0	N-RQ (E Diversey)	0	
6	17031	170310	5	0.06	2030	4.2	S-FA (Ashland)	0	
7	17031	170310	5	0.06	1950	0	S-TQ (S Ashland)	0	Includes SBT, SBR
8	17031	170310	5	0.25	2055	4.2	S-FD (Ashland)	0	
9	17031	170310	5	0.06	80	0	S-LQ (E Diversey)	0	
10	17031	170310	5	0.13	645	8	W-FA (Diversey)	0	
11	17031	170310	5	0.13	449	0	W-TQ (W Diversey)	0	
12	17031	170310	5	0.13	563	8	W-FD (Diversey)	0	
13	17031	170310	5	0.13	132	0	W-LQ (S Ashland)	0	
14	17031	170310	5	0.13	64	0	W-RQ (N Ashland)	0	
15	17031	170310	5	0.13	942	2.5	E-FA (Diversey)	0	
16	17031	170310	5	0.13	683	0	E-TQ (E Diversey)	0	
17	17031	170310	5	0.13	879	2.5	E-FD (Diversey)	0	
18	17031	170310	5	0.13	184	0	E-LQ (N Ashland)	0	
19	17031	170310	5	0.13	75	0	E-RQ (S Ashland)	0	
				Total Volume	4703	(excluding buses)			

Data Sources:
Volumes □ Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □ Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

Legend

▨	Estimated queue length
▨	Contains bus volume
Calculated Value	

Local Buses
10

	Volume	Fraction
Cars	4362	0.9255251
Trucks	341	0.0723531
Buses	10	0.0021218
Total	4713	1
	ok	

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005260611	0.005271603
Cars	21	0.326370627	0.32705261
Cars	31	0.445420429	0.446351179
Cars	32	0.148473476	0.148783726
Buses	41	0	0
Buses	42	0.002121791	0
Buses	43	0	0
Trucks	51	0.000142514	0.000142884
Trucks	52	0.010831033	0.010859148
Trucks	53	0.000855082	0.000857301
Trucks	54	0.002280217	0.002286136
Trucks	61	0.030869437	0.030949568
Trucks	62	0.027374784	0.027445843
	Total	1	1

CTA Ashland Ave BRT
Intersection 1018: W Diversey Pkwy
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	1624	N-FA (Ashland)	W Wrightwood Ave
NBT	1477	N-TQ (N Ashland)	
	1737	N-FD (Ashland)	W Wolfram St
NBL	18	N-LQ (W Diversey)	
NBR	129	N-RQ (E Diversey)	
	1818	S-FA (Ashland)	W Wolfram St
SBT	1649	S-TQ (S Ashland)	
	1837	S-FD (Ashland)	W Wrightwood Ave
SBL	70	S-LQ (E Diversey)	
SBR	99	S-RQ (W Diversey)	
	800	W-FA (Diversey)	N Greenview Ave
WBT	561	W-TQ (W Diversey)	
	678	W-FD (Diversey)	N Paulina St
WBL	148	W-LQ (S Ashland)	
WBR	91	W-RQ (N Ashland)	
	697	E-FA (Diversey)	N Paulina St
EBT	488	E-TQ (E Diversey)	
	687	E-FD (Diversey)	N Greenview Ave
EBL	169	E-LQ (N Ashland)	
EBR	40	E-RQ (S Ashland)	
Total Volume	4921	(excluding buses)	

MOVES Link Importer (PM Peak) 1018 W Diversey Pkwy 5:15 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.25	1624	4	N-FA (Ashland)	0	
2	17031	170310	5	0.25	1477	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.06	1737	4	N-FD (Ashland)	0	
4	17031	170310	5	0.25	18	0	N-LQ (W Diversey)	0	
5	17031	170310	5	0.25	129	0	N-RQ (E Diversey)	0	
6	17031	170310	5	0.06	1818	4.5	S-FA (Ashland)	0	
7	17031	170310	5	0.06	1748	0	S-TQ (S Ashland)	0	Includes SBT, SBR
8	17031	170310	5	0.25	1837	4.5	S-FD (Ashland)	0	
9	17031	170310	5	0.06	70	0	S-LQ (E Diversey)	0	
10	17031	170310	5	0.13	800	5	W-FA (Diversey)	0	
11	17031	170310	5	0.13	561	0	W-TQ (W Diversey)	0	
12	17031	170310	5	0.13	678	5	W-FD (Diversey)	0	
13	17031	170310	5	0.13	148	0	W-LQ (S Ashland)	0	
14	17031	170310	5	0.13	91	0	W-RQ (N Ashland)	0	
15	17031	170310	5	0.13	697	7.1	E-FA (Diversey)	0	
16	17031	170310	5	0.13	488	0	E-TQ (E Diversey)	0	
17	17031	170310	5	0.13	687	7.1	E-FD (Diversey)	0	
18	17031	170310	5	0.13	169	0	E-LQ (N Ashland)	0	
19	17031	170310	5	0.13	40	0	E-RQ (S Ashland)	0	
				Total Volume	4921	(excluding buses)			

Data Sources:
Volumes □ Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □ Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Legend
▨ Estimated queue length
🟧 Contains bus volume
Calculated Value

Local Buses
9

	Volume	Fraction
Cars	4564	0.9257606
Trucks	357	0.0724138
Buses	9	0.0018256
Total	4930	1

ok

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005261949	0.005271603
Cars	21	0.326453674	0.32705261
Cars	31	0.44553377	0.446351179
Cars	32	0.148511257	0.148783726
Buses	41	0	0
Buses	42	0.001825558	0
Buses	43	0	0
Trucks	51	0.000142633	0.000142884
Trucks	52	0.010840123	0.010859148
Trucks	53	0.000855799	0.000857301
Trucks	54	0.002282131	0.002286136
Trucks	61	0.030895346	0.030949568
Trucks	62	0.02739776	0.027445843
	Total	1	1

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA □ N-TQ □ N-LQ □ N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD □ N-TQ □ E-LQ □ W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1001: W Irving Park Rd
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	1006	N-FA (Ashland)	W Byron St
NBT	800	N-TQ (N Ashland)	
	1054	N-FD (Ashland)	W Belle Plaine Ave
NBL	106	N-LQ (W Irving Park)	
NBR	100	N-RQ (E Irving Park)	
	1159	S-FA (Ashland)	W Belle Plaine Ave
SBT	942	S-TQ (S Ashland)	
	1202	S-FD (Ashland)	W Byron St
SBL	78	S-LQ (E Irving Park)	
SBR	139	S-RQ (W Irving Park)	
	992	W-FA (Irving Park)	N Greenview Ave
WBT	826	W-TQ (W Irving Park)	
	1071	W-FD (Irving Park)	N Ravenswood Ave
WBL	127	W-LQ (S Ashland)	
WBR	39	W-RQ (N Ashland)	
	1191	E-FA (Irving Park)	N Ravenswood Ave
EBT	843	E-TQ (E Irving Park)	
	1021	E-FD (Irving Park)	N Greenview Ave
EBL	215	E-LQ (N Ashland)	
EBR	133	E-RQ (S Ashland)	
Total Volume	4328	(excluding buses)	

Data Sources:
Volumes □ Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □ Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

MOVES Link Importer (AM Peak) 1001 W Irving Park Rd 7:15 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.13	1006	16.2	N-FA (Ashland)	0	
2	17031	170310	5	0.13	800	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.13	1054	16.2	N-FD (Ashland)	0	
4	17031	170310	5	0.13	106	0	N-LQ (W Irving Park)	0	
5	17031	170310	5	0.13	100	0	N-RQ (E Irving Park)	0	
6	17031	170310	5	0.13	1159	7.8	S-FA (Ashland)	0	
7	17031	170310	5	0.13	942	0	S-TQ (S Ashland)	0	
8	17031	170310	5	0.13	1202	7.8	S-FD (Ashland)	0	
9	17031	170310	5	0.13	78	0	S-LQ (E Irving Park)	0	
10	17031	170310	5	0.13	139	0	S-RQ (W Irving Park)	0	
11	17031	170310	5	0.08	992	8.8	W-FA (Irving Park)	0	
12	17031	170310	5	0.08	865	0	W-TQ (W Irving Park)	0	Includes WBT, WBR
13	17031	170310	5	0.25	1071	8.8	W-FD (Irving Park)	0	
14	17031	170310	5	0.08	127	0	W-LQ (S Ashland)	0	
15	17031	170310	5	0.25	1191	9	E-FA (Irving Park)	0	
16	17031	170310	5	0.25	843	0	E-TQ (E Irving Park)	0	
17	17031	170310	5	0.08	1021	9	E-FD (Irving Park)	0	
18	17031	170310	5	0.25	215	0	E-LQ (N Ashland)	0	
19	17031	170310	5	0.25	133	0	E-RQ (S Ashland)	0	
				Total Volume	4328	(excluding buses)			

Legend
▨ Estimated queue length
🟧 Contains bus volume
Calculated Value

Local Buses
10

	Volume	Fraction
Cars	4014	0.9253112
Trucks	314	0.0723836
Buses	10	0.0023052
Total	4338	1
	ok	

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005259395	0.005271603
Cars	21	0.326295184	0.32705261
Cars	31	0.445317468	0.446351179
Cars	32	0.148439156	0.148783726
Buses	41	0	0
Buses	42	0.00230521	0
Buses	43	0	0
Trucks	51	0.000142574	0.000142884
Trucks	52	0.010835601	0.010859148
Trucks	53	0.000855442	0.000857301
Trucks	54	0.002281179	0.002286136
Trucks	61	0.030882459	0.030949568
Trucks	62	0.027386331	0.027445843
	Total	1	1

CTA Ashland Ave BRT
Intersection 1001: W Irving Park Rd
Existing Conditions (No Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	1143	N-FA (Ashland)	W Byron St
NBT	925	N-TQ (N Ashland)	
	1204	N-FD (Ashland)	W Belle Plaine Ave
NBL	106	N-LQ (W Irving Park)	
NBR	112	N-RQ (E Irving Park)	
	1233	S-FA (Ashland)	W Belle Plaine Ave
SBT	988	S-TQ (S Ashland)	
	1301	S-FD (Ashland)	W Byron St
SBL	79	S-LQ (E Irving Park)	
SBR	166	S-RQ (W Irving Park)	
	935	W-FA (Irving Park)	N Greenview Ave
WBT	751	W-TQ (W Irving Park)	
	1023	W-FD (Irving Park)	N Ravenswood Ave
WBL	133	W-LQ (S Ashland)	
WBR	51	W-RQ (N Ashland)	
	1199	E-FA (Irving Park)	N Ravenswood Ave
EBT	791	E-TQ (E Irving Park)	
	982	E-FD (Irving Park)	N Greenview Ave
EBL	228	E-LQ (N Ashland)	
EBR	180	E-RQ (S Ashland)	
Total Volume	4492	(excluding buses)	

MOVES Link Importer (AM Peak) 1001 W Irving Park Rd 5:00 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.13	1143	14.4	N-FA (Ashland)	0	
2	17031	170310	5	0.13	925	0	N-TQ (N Ashland)	0	
3	17031	170310	5	0.13	1204	14.4	N-FD (Ashland)	0	
4	17031	170310	5	0.13	106	0	N-LQ (W Irving Park)	0	
5	17031	170310	5	0.13	112	0	N-RQ (E Irving Park)	0	
6	17031	170310	5	0.13	1233	6.7	S-FA (Ashland)	0	
7	17031	170310	5	0.13	988	0	S-TQ (S Ashland)	0	
8	17031	170310	5	0.13	1301	6.7	S-FD (Ashland)	0	
9	17031	170310	5	0.13	79	0	S-LQ (E Irving Park)	0	
10	17031	170310	5	0.13	166	0	S-RQ (W Irving Park)	0	
11	17031	170310	5	0.08	935	9.4	W-FA (Irving Park)	0	
12	17031	170310	5	0.08	802	0	W-TQ (W Irving Park)	0	Includes WBT, WBR
13	17031	170310	5	0.25	1023	9.4	W-FD (Irving Park)	0	
14	17031	170310	5	0.08	133	0	W-LQ (S Ashland)	0	
15	17031	170310	5	0.25	1199	9.6	E-FA (Irving Park)	0	
16	17031	170310	5	0.25	791	0	E-TQ (E Irving Park)	0	
17	17031	170310	5	0.08	982	9.6	E-FD (Irving Park)	0	
18	17031	170310	5	0.25	228	0	E-LQ (N Ashland)	0	
19	17031	170310	5	0.25	180	0	E-RQ (S Ashland)	0	
				Total Volume	4492	(excluding buses)			

Data Sources:
Volumes Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Legend

▨	Estimated queue length
🟧	Contains bus volume
Calculated Value	

Local Buses
9

	Volume	Fraction
Cars	4166	0.9255721
Trucks	326	0.0724283
Buses	9	0.0019996
Total	4501	1
	ok	

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005260877	0.005271603
Cars	21	0.326387184	0.32705261
Cars	31	0.445443026	0.446351179
Cars	32	0.148481009	0.148783726
Buses	41	0	0
Buses	42	0.001999556	0
Buses	43	0	0
Trucks	51	0.000142662	0.000142884
Trucks	52	0.010842302	0.010859148
Trucks	53	0.000855971	0.000857301
Trucks	54	0.00228259	0.002286136
Trucks	61	0.030901557	0.030949568
Trucks	62	0.027403267	0.027445843
	Total	1	1

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA N-TQ N-LQ N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD N-TQ E-LQ W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1094: W Roosevelt Rd
Existing Conditions (No Build Alternative)

MOVES Link Importer (AM Peak) 1094 W Roosevelt Rd 7:45 AM peak hour

Synchro ID	linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Intersection Endpoint
	1	17031	170310	5	0.12	1323	3.5	N-FA (Ashland)	0	W 13th St
NBT	2	17031	170310	5	▨ 0.12	🟧 1085	0	N-TQ (N Ashland)	0	
	3	17031	170310	5	0.17	1431	3.5	N-FD (Ashland)	0	W Taylor St
NBL	4	17031	170310	5	▨ 0.12	130	0	N-LQ (W Roosevelt)	0	
NBR	5	17031	170310	5	▨ 0.12	108	0	N-RQ (E Roosevelt)	0	
	6	17031	170310	5	0.17	1326	6.6	S-FA (Ashland)	0	W Taylor St
SBT	7	17031	170310	5	▨ 0.17	🟧 1100	0	S-TQ (S Ashland)	0	
	8	17031	170310	5	0.12	1364	6.6	S-FD (Ashland)	0	W 13th St
SBL	9	17031	170310	5	▨ 0.17	130	0	S-LQ (E Roosevelt)	0	
SBR	10	17031	170310	5	▨ 0.17	96	0	S-RQ (W Roosevelt)	0	
	11	17031	170310	5	0.25	2253	1.7	W-FA (Roosevelt)	0	S Loomis St
WBT	12	17031	170310	5	▨ 0.25	1861	0	W-TQ (W Roosevelt)	0	
	13	17031	170310	5	0.13	2087	1.7	W-FD (Roosevelt)	0	S Paulina St
WBL	14	17031	170310	5	▨ 0.25	170	0	W-LQ (S Ashland)	0	
WBR	15	17031	170310	5	▨ 0.25	222	0	W-RQ (N Ashland)	0	
	16	17031	170310	5	0.13	873	13.2	E-FA (Roosevelt)	0	S Paulina St
EBT	17	17031	170310	5	▨ 0.13	655	0	E-TQ (E Roosevelt)	0	
	18	17031	170310	5	0.25	893	13.2	E-FD (Roosevelt)	0	S Loomis St
EBL	19	17031	170310	5	▨ 0.13	124	0	E-LQ (N Ashland)	0	
EBR	20	17031	170310	5	▨ 0.13	94	0	E-RQ (S Ashland)	0	
					Total Volume	5755	(excluding buses)			

Data Sources:
Volumes Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

Legend
▨ Estimated queue length
🟧 Contains bus volume
Calculated Value

Local Buses
10

	Volume	Fraction
Cars	5338	0.9259324
Trucks	417	0.072333
Buses	10	0.0017346
Total	5765	1
	ok	

Category	Source Type	Fraction Ashland Ave	Fraction Cross Streets
Cars	11	0.005262925	0.005271603
Cars	21	0.326514221	0.32705261
Cars	31	0.445616403	0.446351179
Cars	32	0.148538801	0.148783726
Buses	41	0	0
Buses	42	0.001734605	0
Buses	43	0	0
Trucks	51	0.000142474	0.000142884
Trucks	52	0.010828035	0.010859148
Trucks	53	0.000854845	0.000857301
Trucks	54	0.002279586	0.002286136
Trucks	61	0.030860895	0.030949568
Trucks	62	0.027367209	0.027445843
	Total	1	1

CTA Ashland Ave BRT
Intersection 1094: W Roosevelt Rd
Existing Conditions (No Build Alternative)

MOVES Link Importer (PM Peak) 1094 W Roosevelt Rd 4:45 PM peak hour

Synchro ID	linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Intersection Endpoint
	1	17031	170310	5	0.12	1193	7.7	N-FA (Ashland)	0	W 13th St
NBT	2	17031	170310	5	0.12	871	0	N-TQ (N Ashland)	0	
	3	17031	170310	5	0.17	1098	7.7	N-FD (Ashland)	0	W Taylor St
NBL	4	17031	170310	5	0.12	161	0	N-LQ (W Roosevelt)	0	
NBR	5	17031	170310	5	0.12	161	0	N-RQ (E Roosevelt)	0	
	6	17031	170310	5	0.17	2127	1.5	S-FA (Ashland)	0	W Taylor St
SBT	7	17031	170310	5	0.17	1815	0	S-TQ (S Ashland)	0	
	8	17031	170310	5	0.12	2205	1.5	S-FD (Ashland)	0	W 13th St
SBL	9	17031	170310	5	0.17	212	0	S-LQ (E Roosevelt)	0	
SBR	10	17031	170310	5	0.17	100	0	S-RQ (W Roosevelt)	0	
	11	17031	170310	5	0.25	1476	4	W-FA (Roosevelt)	0	S Loomis St
WBT	12	17031	170310	5	0.25	1150	0	W-TQ (W Roosevelt)	0	
	13	17031	170310	5	0.13	1411	4	W-FD (Roosevelt)	0	S Paulina St
WBL	14	17031	170310	5	0.25	199	0	W-LQ (S Ashland)	0	
WBR	15	17031	170310	5	0.25	127	0	W-RQ (N Ashland)	0	
	16	17031	170310	5	0.13	1239	5.4	E-FA (Roosevelt)	0	S Paulina St
EBT	17	17031	170310	5	0.13	948	0	E-TQ (E Roosevelt)	0	
	18	17031	170310	5	0.25	1321	5.4	E-FD (Roosevelt)	0	S Loomis St
EBL	19	17031	170310	5	0.13	100	0	E-LQ (N Ashland)	0	
EBR	20	17031	170310	5	0.13	191	0	E-RQ (S Ashland)	0	
					Total Volume	6017	(excluding buses)			

Data Sources:
Volumes □ Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □ Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Legend
▨ Estimated queue length
🟧 Contains bus volume
Calculated Value

	Volume	Fraction
Cars	5581	0.9261533
Trucks	436	0.0723531
Buses	9	0.0014935
Total	6026	1
	ok	

Local Buses
9

		Fraction	
Category	Source Type	Ashland Ave	Cross Streets
Cars	11	0.005264181	0.005271603
Cars	21	0.326592148	0.32705261
Cars	31	0.445722755	0.446351179
Cars	32	0.148574252	0.148783726
Buses	41	0	0
Buses	42	0.001493528	0
Buses	43	0	0
Trucks	51	0.000142514	0.000142884
Trucks	52	0.010831043	0.010859148
Trucks	53	0.000855082	0.000857301
Trucks	54	0.00228022	0.002286136
Trucks	61	0.030869467	0.030949568
Trucks	62	0.02737481	0.027445843
	Total	1	1

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA □ N-TQ □ N-LQ □ N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD □ N-TQ □ E-LQ □ W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1011: W Belmont Ave / N Lincoln Ave
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection End Point
	702	N-FA (Ashland)	W Barry Ave
NBT	627	N-TQ (N Ashland)	
	727	N-FD (Ashland)	W School St
	12	N-FA-BUS (Ashland)	W Barry Ave
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W School St
NBR	74	N-RQ (E Belmont)	
NBR2	1	N-RQ2 (SE Lincoln)	
	597	S-FA (Ashland)	W School St
SBT	544	S-TQ (S Ashland)	
	709	S-FD (Ashland)	W Barry Ave
	12	S-FA-BUS (Ashland)	W School St
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W Barry Ave
SBR	53	S-RQ (W Belmont)	
	484	W-FA (Belmont)	N Greenview Ave
WBT	307	W-TQ (W Belmont)	
	378	W-FD (Belmont)	N Paulina St
WBR	143	W-RQ (NW Lincoln)	
WBR2	34	W-RQ2 (N Ashland)	
	641	E-FA (Belmont)	N Paulina St
EBT	489	E-TQ (E Belmont)	
	601	E-FD (Belmont)	N Greenview Ave
EBL2	4	E-LQ2 (NW Lincoln)	
EBR	105	E-RQ (SE Lincoln)	
EBR2	43	E-RQ2 (S Ashland)	
	501	SE-FA (Lincoln)	W School St
SET	350	SE-TQ (SE Lincoln)	
	456	SE-FD (Lincoln)	W Barry Ave
SEL	36	SE-LQ (E Belmont)	
SER	113	SE-RQ (S Ashland)	
SER2	2	SE-RQ2 (W Belmont)	
	339	NW-FA (Lincoln)	W Barry Ave
NWT	246	NW-TQ (NW Lincoln)	
	393	NW-FD (Lincoln)	W School St
NWL	16	NW-LQ (W Belmont)	
NWL2	9	NW-LQ2 (S Ashland)	
NWR	66	NW-RQ (N Ashland)	
NWR2	2	NW-RQ2 (E Belmont)	
Total Volume	3258	(excluding buses)	

Data Sources:
Volumes □Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

MOVES Link Importer (AM Peak) 1011 W Belmont Ave □N Lincoln Ave 7:30 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.13	702	1.6	N-FA (Ashland)	0	
2	17031	170310	5	0.13	702	0	N-TQ (N Ashland)	0	Includes NBT, NBR, NBR2
3	17031	170310	5	0.13	727	1.6	N-FD (Ashland)	0	
4	17031	170310	5	0.13	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.13	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.13	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.13	597	5.1	S-FA (Ashland)	0	
8	17031	170310	5	0.13	597	0	S-TQ (S Ashland)	0	Includes SBT, SBR
9	17031	170310	5	0.13	709	5.1	S-FD (Ashland)	0	
10	17031	170310	5	0.13	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.13	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.13	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.12	484	7.2	W-FA (Belmont)	0	
14	17031	170310	5	0.12	307	0	W-TQ (W Belmont)	0	
15	17031	170310	5	0.13	378	7.2	W-FD (Belmont)	0	
16	17031	170310	5	0.12	177	0	W-RQ (NW Lincoln)	0	Includes WBR, WBR2
17	17031	170310	5	0.13	641	1.7	E-FA (Belmont)	0	
18	17031	170310	5	0.13	641	0	E-TQ (E Belmont)	0	Includes EBT, EBL2, EBR, EBR2
19	17031	170310	5	0.12	601	1.7	E-FD (Belmont)	0	
20	17031	170310	5	0.15	501	1.4	SE-FA (Lincoln)	0	
21	17031	170310	5	0.15	465	0	SE-TQ (SE Lincoln)	0	Includes SET, SER, SER2
22	17031	170310	5	0.18	456	1.4	SE-FD (Lincoln)	0	
23	17031	170310	5	0.15	36	0	SE-LQ (E Belmont)	0	
24	17031	170310	5	0.18	339	3.5	NW-FA (Lincoln)	0	
25	17031	170310	5	0.18	314	0	NW-TQ (NW Lincoln)	0	Includes NWT, NWR, NWR2
26	17031	170310	5	0.15	393	3.5	NW-FD (Lincoln)	0	
27	17031	170310	5	0.18	25	0	NW-LQ (W Belmont)	0	Includes NWL, NWL2
				Total Volume	3258	(excluding buses)			

Legend
▨ Estimated queue length
🟧 Contains bus volume
🟦 New project links
Calculated Value

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.00517845	0	0.005183218
Cars	21	0.321273346	0	0.321569178
Cars	31	0.438463821	0	0.438867563
Cars	32	0.146154607	0	0.146289188
Buses	41	0	0	0
Buses	42	0.000919963	1	0
Buses	43	0	0	0
Trucks	51	0.000173353	0	0.000173512
Trucks	52	0.0131748	0	0.013186931
Trucks	53	0.001040116	0	0.001041074
Trucks	54	0.002773642	0	0.002776196
Trucks	61	0.037549388	0	0.037583964
Trucks	62	0.033298514	0	0.033329176
	Total	1	1	1

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	2971	0.91107
Trucks	287	0.08801
Buses	3	0.00092
Total	3261	1

ok

Cars□Trucks Split

Cars	0.91191
Trucks	0.08809
Total	1

Notes:
No change to truck volume from No Build Alternative
Car volume equal to difference between total non-bus volume and truck volume

CTA Ashland Ave BRT
Intersection 1011: W Belmont Ave / N Lincoln Ave
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection End Point
	689	N-FA (Ashland)	W Barry Ave
NBT	599	N-TQ (N Ashland)	
	771	N-FD (Ashland)	W School St
	12	N-FA-BUS (Ashland)	W Barry Ave
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W School St
NBR	89	N-RQ (E Belmont)	
NBR2	1	N-RQ2 (SE Lincoln)	
	544	S-FA (Ashland)	W School St
SBT	474	S-TQ (S Ashland)	
	631	S-FD (Ashland)	W Barry Ave
	12	S-FA-BUS (Ashland)	W School St
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W Barry Ave
SBR	68	S-RQ (W Belmont)	
SBR2	2	S-RQ2 (NW Lincoln)	
	650	W-FA (Belmont)	N Greenview Ave
WBT	401	W-TQ (W Belmont)	
	512	W-FD (Belmont)	N Paulina St
WBL	4	W-LQ (S Ashland)	
WBR	167	W-RQ (NW Lincoln)	
WBR2	78	W-RQ2 (N Ashland)	
	570	E-FA (Belmont)	N Paulina St
EBT	466	E-TQ (E Belmont)	
	611	E-FD (Belmont)	N Greenview Ave
EBR	69	E-RQ (SE Lincoln)	
EBR2	35	E-RQ2 (S Ashland)	
	429	SE-FA (Lincoln)	W School St
SET	262	SE-TQ (SE Lincoln)	
	332	SE-FD (Lincoln)	W Barry Ave
SEL	49	SE-LQ (E Belmont)	
SEL2	3	SE-LQ2 (N Ashland)	
SER	103	SE-RQ (S Ashland)	
SER2	12	SE-RQ2 (W Belmont)	
	410	NW-FA (Lincoln)	W Barry Ave
NWT	266	NW-TQ (NW Lincoln)	
	435	NW-FD (Lincoln)	W School St
NWL	31	NW-LQ (W Belmont)	
NWL2	15	NW-LQ2 (S Ashland)	
NWR	91	NW-RQ (N Ashland)	
NWR2	7	NW-RQ2 (E Belmont)	
Total Volume	3286	(excluding buses)	

Data Sources:
Volumes □Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (e.g., N-FA □N-TQ □N-LQ □N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffic (e.g., N-FD □N-TQ □E-LQ □W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

MOVES Link Importer (PM Peak) 1011 W Belmont Ave □N Lincoln Ave 5:00 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.13	689	1.8	N-FA (Ashland)	0	
2	17031	170310	5	0.13	689	0	N-TQ (N Ashland)	0	Includes NBT, NBR, NBR2
3	17031	170310	5	0.13	771	1.8	N-FD (Ashland)	0	
4	17031	170310	5	0.13	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.13	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.13	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.13	544	8	S-FA (Ashland)	0	
8	17031	170310	5	0.13	544	0	S-TQ (S Ashland)	0	Includes SBT, SBR, SBR2
9	17031	170310	5	0.13	631	8	S-FD (Ashland)	0	
10	17031	170310	5	0.13	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.13	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.13	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.12	650	1.7	W-FA (Belmont)	0	
14	17031	170310	5	0.12	405	0	W-TQ (W Belmont)	0	Includes WBT, WBL
15	17031	170310	5	0.13	512	1.7	W-FD (Belmont)	0	
16	17031	170310	5	0.12	245	0	W-RQ (NW Lincoln)	0	Includes WBR, WBR2
17	17031	170310	5	0.13	570	2.5	E-FA (Belmont)	0	
18	17031	170310	5	0.13	570	0	E-TQ (E Belmont)	0	Includes EBT, EBR, EBR2
19	17031	170310	5	0.12	611	2.5	E-FD (Belmont)	0	
20	17031	170310	5	0.15	429	1.7	SE-FA (Lincoln)	0	
21	17031	170310	5	0.15	377	0	SE-TQ (SE Lincoln)	0	Includes SET, SER, SER2
22	17031	170310	5	0.18	332	1.7	SE-FD (Lincoln)	0	
23	17031	170310	5	0.15	52	0	SE-LQ (E Belmont)	0	Includes SEL, SEL2
24	17031	170310	5	0.18	410	1.9	NW-FA (Lincoln)	0	
25	17031	170310	5	0.18	364	0	NW-TQ (NW Lincoln)	0	
26	17031	170310	5	0.15	435	1.9	NW-FD (Lincoln)	0	
27	17031	170310	5	0.18	46	0	NW-LQ (W Belmont)	0	Includes NWL, NWL2
				Total Volume	3286	(excluding buses)			

Legend
▨ Estimated queue length
🟧 Contains bus volume
🟦 New project links
⬛ Change in links from AM peak hour
Calculated Value

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	3002	0.912739
Trucks	284	0.086348
Buses	3	0.000912
Total	3289	1

ok

Cars□Trucks Split

Cars	0.913573
Trucks	0.086427
Total	1

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.005187938	0	0.005192674
Cars	21	0.321861965	0	0.322155813
Cars	31	0.439267149	0	0.439668184
Cars	32	0.146422383	0	0.146556061
Buses	41	0	0	0
Buses	42	0.000912131	1	0
Buses	43	0	0	0
Trucks	51	0.00017008	0	0.000170235
Trucks	52	0.012926096	0	0.012937897
Trucks	53	0.001020481	0	0.001021413
Trucks	54	0.002721283	0	0.002723768
Trucks	61	0.036840561	0	0.036874195
Trucks	62	0.032669932	0	0.032699758
	Total	1	1	1

Notes:
No change to truck volume from No Build Alternative
Car volume equal to difference between total non-bus volume and truck volume

CTA Ashland Ave BRT
Intersection 1109: W Cermak Rd
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	778	N-FA (Ashland)	S Archer Ave
NBT	696	N-TQ (N Ashland)	
	1154	N-FD (Ashland)	W 21st Pl
	12	N-FA-BUS (Ashland)	S Archer Ave
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W 21st Pl
NBR	82	N-RQ (E Cermak)	
	613	S-FA (Ashland)	W 21st Pl
SBT	479	S-TQ (S Ashland)	
	660	S-FD (Ashland)	S Archer Ave
	12	S-FA-BUS (Ashland)	W 21st Pl
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	S Archer Ave
SBR	108	S-RQ (SW Blue Island)	
SBR2	26	S-RQ2 (W Cermak)	
	852	W-FA (Cermak)	S Laflin St
WBT	495	W-TQ (W Cermak)	
	521	W-FD (Cermak)	S Paulina St
WBL	92	W-LQ (SW Blue Island)	
WBL2	92	W-LQ2 (S Ashland)	
WBR	173	W-RQ (N Ashland)	
	457	E-FA (Cermak)	S Paulina St
EBT	328	E-TQ (E Cermak)	
	614	E-FD (Cermak)	S Laflin St
EBL	77	E-LQ (N Ashland)	
EBR	52	E-RQ (S Ashland)	
	449	NE-FA (Blue Island)	S Paulina St
NEL	208	NE-LQ (N Ashland)	
NER	204	NE-RQ (E Cermak)	
NER2	37	NE-RQ2 (S Ashland)	
	200	SW-FD (Blue Island)	S Paulina St
Total Volume	3143	(excluding buses)	

Data Sources:
Volumes □ Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □ Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

MOVES Link Importer (AM Peak) 1109 W Cermak Rd 7:15 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	1.01	778	1.8	N-FA (Ashland)	0	
2	17031	170310	5	1.01	778	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.12	1154	1.8	N-FD (Ashland)	0	
4	17031	170310	5	1.01	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	1.01	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	1.01	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.12	613	8.6	S-FA (Ashland)	0	
8	17031	170310	5	0.12	613	0	S-TQ (S Ashland)	0	Includes SBT, SBR, SBR2
9	17031	170310	5	1.01	660	8.6	S-FD (Ashland)	0	
10	17031	170310	5	0.12	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.12	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.12	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.12	852	4.4	W-FA (Cermak)	0	
14	17031	170310	5	0.12	668	0	W-TQ (W Cermak)	0	Includes WBT, WBR
15	17031	170310	5	0.13	521	4.4	W-FD (Cermak)	0	
16	17031	170310	5	0.12	184	0	W-LQ (SW Blue Island)	0	Includes WBL, WBL2
17	17031	170310	5	0.13	457	6.4	E-FA (Cermak)	0	
18	17031	170310	5	0.13	380	0	E-TQ (E Cermak)	0	Includes EBT, EBR
19	17031	170310	5	0.12	614	6.4	E-FD (Cermak)	0	
20	17031	170310	5	0.13	77	0	E-LQ (N Ashland)	0	
21	17031	170310	5	0.14	449	1.5	NE-FA (Blue Island)	0	
22	17031	170310	5	0.14	208	0	NE-LQ (N Ashland)	0	
23	17031	170310	5	0.14	241	0	NE-RQ (E Cermak)	0	Includes NER, NER2
24	17031	170310	5	0.14	200	1.5	SW-FD (Blue Island)	0	
				Total Volume	3143	(excluding buses)			

Legend
▨ Estimated queue length
🟧 Contains bus volume
🟦 New project links
Calculated Value

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	2881	0.915766052
Trucks	262	0.083280356
Buses	3	0.000953592
Total	3146	1
	ok	

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.005205141	0	0.005210109
Cars	21	0.32292925	0	0.323237487
Cars	31	0.440723746	0	0.441144418
Cars	32	0.146907915	0	0.147048139
Buses	41	0	0	0
Buses	42	0.000953592	1	0
Buses	43	0	0	0
Trucks	51	0.000164037	0	0.000164194
Trucks	52	0.012466814	0	0.012478714
Trucks	53	0.000984222	0	0.000985162
Trucks	54	0.002624593	0	0.002627098
Trucks	61	0.035531566	0	0.035565481
Trucks	62	0.031509124	0	0.0315392
	Total	1	1	1

Cars□Trucks Split

Cars	0.91664
Trucks	0.08336
Total	1

Notes:
No change to truck volume from No Build Alternative

Car volume equal to difference between total non-bus volume and truck volume

CTA Ashland Ave BRT
Intersection 1109: W Cermak Rd
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	760	N-FA (Ashland)	S Archer Ave
NBT	686	N-TQ (N Ashland)	
	909	N-FD (Ashland)	W 21st Pl
	12	N-FA-BUS (Ashland)	S Archer Ave
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W 21st Pl
NBR	74	N-RQ (E Cermak)	
	659	S-FA (Ashland)	W 21st Pl
SBT	552	S-TQ (S Ashland)	
	770	S-FD (Ashland)	S Archer Ave
	12	S-FA-BUS (Ashland)	W 21st Pl
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	S Archer Ave
SBR	76	S-RQ (SW Blue Island)	
SBR2	31	S-RQ2 (W Cermak)	
	756	W-FA (Cermak)	S Laflin St
WBT	455	W-TQ (W Cermak)	
	490	W-FD (Cermak)	S Paulina St
WBL	172	W-LQ (SW Blue Island)	
WBL2	84	W-LQ2 (S Ashland)	
WBR	45	W-RQ (N Ashland)	
	486	E-FA (Cermak)	S Paulina St
EBT	318	E-TQ (E Cermak)	
	551	E-FD (Cermak)	S Laflin St
EBL	81	E-LQ (N Ashland)	
EBR	87	E-RQ (S Ashland)	
	307	NE-FA (Blue Island)	S Paulina St
NEL	97	NE-LQ (N Ashland)	
NEL2	4	NE-LQ2 (W Cermak)	
NER	159	NE-RQ (E Cermak)	
NER2	47	NE-RQ2 (S Ashland)	
	248	SW-FD (Blue Island)	S Paulina St
Total Volume	2962	(excluding buses)	

MOVES Link Importer (PM Peak) 1109 W Cermak Rd 4:30 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	1.01	760	2	N-FA (Ashland)	0	
2	17031	170310	5	1.01	760	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.12	909	2	N-FD (Ashland)	0	
4	17031	170310	5	1.01	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	1.01	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	1.01	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.12	659	8.9	S-FA (Ashland)	0	
8	17031	170310	5	0.12	659	0	S-TQ (S Ashland)	0	Includes SBT, SBR, SBR2
9	17031	170310	5	1.01	770	8.9	S-FD (Ashland)	0	
10	17031	170310	5	0.12	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.12	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.12	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.12	756	8	W-FA (Cermak)	0	
14	17031	170310	5	0.12	500	0	W-TQ (W Cermak)	0	Includes WBT, WBR
15	17031	170310	5	0.13	490	8	W-FD (Cermak)	0	
16	17031	170310	5	0.12	256	0	W-LQ (SW Blue Island)	0	Includes WBL, WBL2
17	17031	170310	5	0.13	486	6.5	E-FA (Cermak)	0	
18	17031	170310	5	0.13	405	0	E-TQ (E Cermak)	0	Includes EBT, EBR
19	17031	170310	5	0.12	551	6.5	E-FD (Cermak)	0	
20	17031	170310	5	0.13	81	0	E-LQ (N Ashland)	0	
21	17031	170310	5	0.14	307	5.2	NE-FA (Blue Island)	0	
22	17031	170310	5	0.14	101	0	NE-LQ (N Ashland)	0	Includes NEL, NEL2
23	17031	170310	5	0.14	206	0	NE-RQ (E Cermak)	0	Includes NER, NER2
24	17031	170310	5	0.14	248	5.2	SW-FD (Blue Island)	0	
				Total Volume	2962	(excluding buses)			

Legend

▨	Estimated queue length
🟨	Link not included in AM peak hour
🟧	Contains bus volume
🟦	New project links

Calculated Value

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	2694	0.908600337
Trucks	268	0.090387858
Buses	3	0.001011804
Total	2965	1
	ok	

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.005164411	0	0.005169642
Cars	21	0.320402383	0	0.320726896
Cars	31	0.437275157	0	0.437718042
Cars	32	0.145758386	0	0.145906014
Buses	41	0	0	0
Buses	42	0.001011804	1	0
Buses	43	0	0	0
Trucks	51	0.000178037	0	0.000178217
Trucks	52	0.013530786	0	0.01354449
Trucks	53	0.00106822	0	0.001069302
Trucks	54	0.002848586	0	0.002851472
Trucks	61	0.038563982	0	0.03860304
Trucks	62	0.034198248	0	0.034232885
	Total	1	1	1

Cars□Trucks Split

Cars	0.909521
Trucks	0.090479
Total	1

Notes:
No change to truck volume from No Build Alternative
Car volume equal to difference between total non-bus volume and truck volume

Data Sources:
Volumes □Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA □N-TQ □N-LQ □N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD □N-TQ □E-LQ □W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1018: W Diversey Pkwy
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	691	N-FA (Ashland)	W Wrightwood Ave
NBT	607	N-TQ (N Ashland)	
	859	N-FD (Ashland)	W Wolfram St
	12	N-FA-BUS (Ashland)	W Wrightwood Ave
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W Wolfram St
NBR	84	N-RQ (E Diversey)	
	1065	S-FA (Ashland)	W Wolfram St
SBT	997	S-TQ (S Ashland)	
	1208	S-FD (Ashland)	W Wrightwood Ave
	12	S-FA-BUS (Ashland)	W Wolfram St
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W Wrightwood Ave
SBR	68	S-RQ (W Diversey)	
	696	W-FA (Diversey)	N Greenview Ave
WBT	492	W-TQ (W Diversey)	
	560	W-FD (Diversey)	N Paulina St
WBL	136	W-LQ (S Ashland)	
WBR	68	W-RQ (N Ashland)	
	1039	E-FA (Diversey)	N Paulina St
EBT	780	E-TQ (E Diversey)	
	864	E-FD (Diversey)	N Greenview Ave
EBL	184	E-LQ (N Ashland)	
EBR	75	E-RQ (S Ashland)	
Total Volume	3,485	(excluding buses)	

MOVES Link Importer (AM Peak) 1018 W Diversey Pkwy 7:15 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.25	691	2.1	N-FA (Ashland)	0	
2	17031	170310	5	0.25	691	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.06	859	2.1	N-FD (Ashland)	0	
4	17031	170310	5	0.25	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.25	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.06	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.06	1065	3.7	S-FA (Ashland)	0	
8	17031	170310	5	0.06	1065	0	S-TQ (S Ashland)	0	Includes SBT, SBR
9	17031	170310	5	0.25	1208	3.7	S-FD (Ashland)	0	
10	17031	170310	5	0.06	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.06	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.25	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.13	696	3.6	W-FA (Diversey)	0	
14	17031	170310	5	0.13	492	0	W-TQ (W Diversey)	0	
15	17031	170310	5	0.13	560	3.6	W-FD (Diversey)	0	
16	17031	170310	5	0.13	136	0	W-LQ (S Ashland)	0	
17	17031	170310	5	0.13	68	0	W-RQ (N Ashland)	0	
18	17031	170310	5	0.13	1039	1.4	E-FA (Diversey)	0	
19	17031	170310	5	0.13	780	0	E-TQ (E Diversey)	0	
20	17031	170310	5	0.13	864	1.4	E-FD (Diversey)	0	
21	17031	170310	5	0.13	184	0	E-LQ (N Ashland)	0	
22	17031	170310	5	0.13	75	0	E-RQ (S Ashland)	0	
				Total Volume	3,485	(excluding buses)			

Data Sources:
Volumes □Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

Legend

▨	Estimated queue length
🟧	Contains bus volume
🟦	New project links
Calculated Value	

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	3,144	0.9013761
Trucks	341	0.0977638
Buses	3	0.0008601
Total	3488	1
	ok	

Cars□Trucks Split

Cars	0.902152
Trucks	0.097848
Total	1

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.00512335	0	0.00512776
Cars	21	0.317854896	0	0.318128516
Cars	31	0.433798426	0	0.434171854
Cars	32	0.144599475	0	0.144723951
Buses	41	0	0	0
Buses	42	0.000860092	1	0
Buses	43	0	0	0
Trucks	51	0.000192565	0	0.000192731
Trucks	52	0.014634936	0	0.014647534
Trucks	53	0.00115539	0	0.001156384
Trucks	54	0.003081039	0	0.003083691
Trucks	61	0.041710911	0	0.041746817
Trucks	62	0.036988921	0	0.037020762
	Total	1	1	1

CTA Ashland Ave BRT
Intersection 1018: W Diversey Pkwy
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	862	N-FA (Ashland)	W Wrightwood Ave
NBT	774	N-TQ (N Ashland)	
	1035	N-FD (Ashland)	W Wolfram St
	12	N-FA-BUS (Ashland)	W Wrightwood Ave
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W Wolfram St
NBR	88	N-RQ (E Diversey)	
	1303	S-FA (Ashland)	W Wolfram St
SBT	1218	S-TQ (S Ashland)	
	1410	S-FD (Ashland)	W Wrightwood Ave
	12	S-FA-BUS (Ashland)	W Wolfram St
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W Wrightwood Ave
SBR	85	S-RQ (W Diversey)	
	945	W-FA (Diversey)	N Greenview Ave
WBT	701	W-TQ (W Diversey)	
	786	W-FD (Diversey)	N Paulina St
WBL	152	W-LQ (S Ashland)	
WBR	92	W-RQ (N Ashland)	
	791	E-FA (Diversey)	N Paulina St
EBT	582	E-TQ (E Diversey)	
	670	E-FD (Diversey)	N Greenview Ave
EBL	169	E-LQ (N Ashland)	
EBR	40	E-RQ (S Ashland)	
Total Volume	3895	(excluding buses)	

MOVES Link Importer (PM Peak) 1018 W Diversey Pkwy 5:15 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.2485491	862	1.7	N-FA (Ashland)	0	
2	17031	170310	5	0.2485491	862	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.06082	1035	1.7	N-FD (Ashland)	0	
4	17031	170310	5	0.2485491	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.2485491	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.06082	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.06082	1303	2.4	S-FA (Ashland)	0	
8	17031	170310	5	0.06082	1303	0	S-TQ (S Ashland)	0	Includes SBT, SBR
9	17031	170310	5	0.2485491	1410	2.4	S-FD (Ashland)	0	
10	17031	170310	5	0.06082	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.06082	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.2485491	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.1252066	945	1.6	W-FA (Diversey)	0	
14	17031	170310	5	0.1252066	701	0	W-TQ (W Diversey)	0	
15	17031	170310	5	0.1252066	786	1.6	W-FD (Diversey)	0	
16	17031	170310	5	0.1252066	152	0	W-LQ (S Ashland)	0	
17	17031	170310	5	0.1252066	92	0	W-RQ (N Ashland)	0	
18	17031	170310	5	0.1252066	791	2.5	E-FA (Diversey)	0	
19	17031	170310	5	0.1252066	582	0	E-TQ (E Diversey)	0	
20	17031	170310	5	0.1252066	670	2.5	E-FD (Diversey)	0	
21	17031	170310	5	0.1252066	169	0	E-LQ (N Ashland)	0	
22	17031	170310	5	0.1252066	40	0	E-RQ (S Ashland)	0	
				Total Volume	3895	(excluding buses)			

Data Sources:
Volumes □Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Legend	
	Estimated queue length
▨	Estimated queue length
🟧	Contains bus volume
🟦	New project links
Calculated Value	

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	3,538	0.9076449
Trucks	357	0.0915854
Buses	3	0.0007696
Total	3898	1
	ok	

Cars□Trucks Split

Cars	0.908344
Trucks	0.091656
Total	1

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.005158981	0	0.005162955
Cars	21	0.320065481	0	0.320312001
Cars	31	0.436815363	0	0.437151806
Cars	32	0.145605121	0	0.145717269
Buses	41	0	0	0
Buses	42	0.000769625	1	0
Buses	43	0	0	0
Trucks	51	0.000180396	0	0.000180534
Trucks	52	0.013710058	0	0.013720618
Trucks	53	0.001082373	0	0.001083207
Trucks	54	0.002886328	0	0.002888551
Trucks	61	0.039074925	0	0.039105021
Trucks	62	0.034651349	0	0.034678038
	Total	1	1	1

Notes:
No change to truck volume from No Build Alternative
Car volume equal to difference between total non-bus volume and truck volume

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA □N-TQ □N-LQ □N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD □N-TQ □E-LQ □W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1001: W Irving Park Rd
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	644	N-FA (Ashland)	W Byron St
NBT	572	N-TQ (N Ashland)	
	827	N-FD (Ashland)	W Belle Plaine Ave
	12	N-FA-BUS (Ashland)	W Byron St
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W Belle Plaine Ave
NBR	72	N-RQ (E Irving Park)	
	922	S-FA (Ashland)	W Belle Plaine Ave
SBT	811	S-TQ (S Ashland)	
	1077	S-FD (Ashland)	W Byron St
	12	S-FA-BUS (Ashland)	W Belle Plaine Ave
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W Byron St
SBR	111	S-RQ (W Irving Park)	
	1110	W-FA (Irving Park)	N Greenview Ave
WBT	943	W-TQ (W Irving Park)	
	1054	W-FD (Irving Park)	N Ravenswood Ave
WBL	128	W-LQ (S Ashland)	
WBR	39	W-RQ (N Ashland)	
	1276	E-FA (Irving Park)	N Ravenswood Ave
EBT	922	E-TQ (E Irving Park)	
	994	E-FD (Irving Park)	N Greenview Ave
EBL	216	E-LQ (N Ashland)	
EBR	138	E-RQ (S Ashland)	
Total Volume	3946	(excluding buses)	

Data Sources:
Volumes □Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

Legend

▨	Estimated queue length
🟧	Contains bus volume
🟦	New project links
Calculated Value	

Peak Bus Volume

Local	3
BRT	12

MOVES Link Importer (AM Peak) 1001 W Irving Park Rd 7:15 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.13	644	11.6	N-FA (Ashland)	0	
2	17031	170310	5	0.13	644	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.13	827	11.6	N-FD (Ashland)	0	
4	17031	170310	5	0.13	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.13	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.13	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.13	922	3	S-FA (Ashland)	0	
8	17031	170310	5	0.13	922	0	S-TQ (S Ashland)	0	Includes SBT, SBR
9	17031	170310	5	0.13	1077	3	S-FD (Ashland)	0	
10	17031	170310	5	0.13	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.13	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.13	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.08	1110	3.2	W-FA (Irving Park)	0	
14	17031	170310	5	0.08	982	0	W-TQ (W Irving Park)	0	Includes WBT, WBR
15	17031	170310	5	0.25	1054	3.2	W-FD (Irving Park)	0	
16	17031	170310	5	0.08	128	0	W-LQ (S Ashland)	0	
17	17031	170310	5	0.25	1276	4.4	E-FA (Irving Park)	0	
18	17031	170310	5	0.25	922	0	E-TQ (E Irving Park)	0	
19	17031	170310	5	0.08	994	4.4	E-FD (Irving Park)	0	
20	17031	170310	5	0.25	216	0	E-LQ (N Ashland)	0	
21	17031	170310	5	0.25	138	0	E-RQ (S Ashland)	0	
				Total Volume	3946	(excluding buses)			

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	3,632	0.9197265
Trucks	314	0.0795138
Buses	3	0.0007597
Total	3949	1
	ok	

Cars□Trucks Split

Cars	0.920426
Trucks	0.079574
Total	1

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.005227652	0	0.005231626
Cars	21	0.324325839	0	0.324572412
Cars	31	0.442629767	0	0.442966282
Cars	32	0.147543256	0	0.147655427
Buses	41	0	0	0
Buses	42	0.000759686	1	0
Buses	43	0	0	0
Trucks	51	0.000156618	0	0.000156737
Trucks	52	0.011902973	0	0.011912022
Trucks	53	0.000939708	0	0.000940423
Trucks	54	0.002505889	0	0.002507794
Trucks	61	0.033924565	0	0.033950356
Trucks	62	0.030084048	0	0.03010692
	Total	1	1	1

CTA Ashland Ave BRT
Intersection 1001: W Irving Park Rd
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	630	N-FA (Ashland)	W Byron St
NBT	562	N-TQ (N Ashland)	
	842	N-FD (Ashland)	W Belle Plaine Ave
	12	N-FA-BUS (Ashland)	W Byron St
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W Belle Plaine Ave
NBR	68	N-RQ (E Irving Park)	
	982	S-FA (Ashland)	W Belle Plaine Ave
SBT	849	S-TQ (S Ashland)	
	1161	S-FD (Ashland)	W Byron St
	12	S-FA-BUS (Ashland)	W Belle Plaine Ave
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W Byron St
SBR	133	S-RQ (W Irving Park)	
	1059	W-FA (Irving Park)	N Greenview Ave
WBT	875	W-TQ (W Irving Park)	
	1008	W-FD (Irving Park)	N Ravenswood Ave
WBL	132	W-LQ (S Ashland)	
WBR	52	W-RQ (N Ashland)	
	1279	E-FA (Irving Park)	N Ravenswood Ave
EBT	871	E-TQ (E Irving Park)	
	939	E-FD (Irving Park)	N Greenview Ave
EBL	228	E-LQ (N Ashland)	
EBR	180	E-RQ (S Ashland)	
Total Volume	3944	(excluding buses)	

MOVES Link Importer (PM Peak) 1001 W Irving Park Rd 5:00 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.12589	630	13.8	N-FA (Ashland)	0	
2	17031	170310	5	0.12589	630	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.125443	842	13.8	N-FD (Ashland)	0	
4	17031	170310	5	0.12589	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.12589	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.12589	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.125443	982	2.5	S-FA (Ashland)	0	
8	17031	170310	5	0.125443	982	0	S-TQ (S Ashland)	0	Includes SBT, SBR
9	17031	170310	5	0.12589	1161	2.5	S-FD (Ashland)	0	
10	17031	170310	5	0.125443	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.125443	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.125443	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.07938	1059	3.2	W-FA (Irving Park)	0	
14	17031	170310	5	0.07938	927	0	W-TQ (W Irving Park)	0	Includes WBT, WBR
15	17031	170310	5	0.245796	1008	3.2	W-FD (Irving Park)	0	
16	17031	170310	5	0.07938	132	0	W-LQ (S Ashland)	0	
17	17031	170310	5	0.245796	1279	4.5	E-FA (Irving Park)	0	
18	17031	170310	5	0.245796	871	0	E-TQ (E Irving Park)	0	
19	17031	170310	5	0.07938	939	4.5	E-FD (Irving Park)	0	
20	17031	170310	5	0.245796	228	0	E-LQ (N Ashland)	0	
21	17031	170310	5	0.245796	180	0	E-RQ (S Ashland)	0	
				Total Volume	3944	(excluding buses)			

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	3,618	0.9166456
Trucks	326	0.0825944
Buses	3	0.0007601
Total	3947	1
	ok	

Cars□Trucks Split

Cars	0.917343
Trucks	0.082657
Total	1

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.00521014	0	0.005214103
Cars	21	0.323239391	0	0.323485263
Cars	31	0.441147017	0	0.441482575
Cars	32	0.147049006	0	0.147160858
Buses	41	0	0	0
Buses	42	0.000760071	1	0
Buses	43	0	0	0
Trucks	51	0.000162686	0	0.00016281
Trucks	52	0.012364125	0	0.01237353
Trucks	53	0.000976115	0	0.000976858
Trucks	54	0.002602974	0	0.002604954
Trucks	61	0.035238892	0	0.035265696
Trucks	62	0.031249583	0	0.031273353
	Total	1	1	1

Notes:
No change to truck volume from No Build Alternative
Car volume equal to difference between total non-bus volume and truck volume

Data Sources:
Volumes □Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Legend
▨ Estimated queue length
🟧 Contains bus volume
🟦 New project links
Calculated Value

Peak Bus Volume

Local	3
BRT	12

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA □N-TQ □N-LQ □N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD □N-TQ □E-LQ □W-RQ)

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT
Intersection 1094: W Roosevelt Rd
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	753	N-FA (Ashland)	W 13th St
NBT	631	N-TQ (N Ashland)	
	1012	N-FD (Ashland)	W Taylor St
	12	N-FA-BUS (Ashland)	W 13th St
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W Taylor St
NBR	122	N-RQ (E Roosevelt)	
	887	S-FA (Ashland)	W Taylor St
SBT	797	S-TQ (S Ashland)	
	1090	S-FD (Ashland)	W 13th St
	12	S-FA-BUS (Ashland)	W Taylor St
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W 13th St
SBR	90	S-RQ (W Roosevelt)	
	2525	W-FA (Roosevelt)	S Loomis St
WBT	2103	W-TQ (W Roosevelt)	
	2193	W-FD (Roosevelt)	S Paulina St
WBL	171	W-LQ (S Ashland)	
WBR	251	W-RQ (N Ashland)	
	1104	E-FA (Roosevelt)	S Paulina St
EBT	852	E-TQ (E Roosevelt)	
	974	E-FD (Roosevelt)	S Loomis St
EBL	130	E-LQ (N Ashland)	
EBR	122	E-RQ (S Ashland)	
Total Volume	5263	(excluding buses)	

MOVES Link Importer (AM Peak) 1094 W Roosevelt Rd 7:45 AM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.12	753	1.7	N-FA (Ashland)	0	
2	17031	170310	5	0.12	753	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.17	1012	1.7	N-FD (Ashland)	0	
4	17031	170310	5	0.12	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.12	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.12	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.17	887	3.2	S-FA (Ashland)	0	
8	17031	170310	5	0.17	797	0	S-TQ (S Ashland)	0	
9	17031	170310	5	0.12	1090	3.2	S-FD (Ashland)	0	
10	17031	170310	5	0.12	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.12	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.12	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.17	90	0	S-RQ (W Roosevelt)	0	
14	17031	170310	5	0.25	2525	2.7	W-FA (Roosevelt)	0	
15	17031	170310	5	0.25	2103	0	W-TQ (W Roosevelt)	0	
16	17031	170310	5	0.13	2193	2.7	W-FD (Roosevelt)	0	
17	17031	170310	5	0.25	171	0	W-LQ (S Ashland)	0	
18	17031	170310	5	0.25	251	0	W-RQ (N Ashland)	0	
19	17031	170310	5	0.13	1104	12.8	E-FA (Roosevelt)	0	
20	17031	170310	5	0.13	852	0	E-TQ (E Roosevelt)	0	
21	17031	170310	5	0.25	974	12.8	E-FD (Roosevelt)	0	
22	17031	170310	5	0.13	130	0	E-LQ (N Ashland)	0	
23	17031	170310	5	0.13	122	0	E-RQ (S Ashland)	0	
				Total Volume	5263	(excluding buses)			

Data Sources:
Volumes □Ashland AM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland AM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland AM Arterial LOS Cross Streets 2013-05-03.pdf

Legend

▨	Estimated queue length
▨	Contains bus volume
▨	New project links
Calculated Value	

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	4,846	0.9202431
Trucks	417	0.0791872
Buses	3	0.0005697
Total	5266	1

ok

Cars Trucks Split

Cars	0.920768
Trucks	0.079232
Total	1

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.005230588	0	0.005233569
Cars	21	0.324507993	0	0.324692969
Cars	31	0.442878366	0	0.443130814
Cars	32	0.147626122	0	0.147710271
Buses	41	0	0	0
Buses	42	0.000569692	1	0
Buses	43	0	0	0
Trucks	51	0.000155975	0	0.000156064
Trucks	52	0.011854087	0	0.011860844
Trucks	53	0.000935849	0	0.000936382
Trucks	54	0.002495597	0	0.00249702
Trucks	61	0.033785237	0	0.033804495
Trucks	62	0.029960493	0	0.029977571
	Total	1	1	1

CTA Ashland Ave BRT
Intersection 1094: W Roosevelt Rd
Proposed Action (Build Alternative)

Volume Calculations

Synchro ID	linkVolume	linkDescription	Intersection Endpoint
	601	N-FA (Ashland)	W 13th St
NBT	487	N-TQ (N Ashland)	
	730	N-FD (Ashland)	W Taylor St
	12	N-FA-BUS (Ashland)	W 13th St
	12	N-TQ-BUS (Ashland)	
	12	N-FD-BUS (Ashland)	W Taylor St
NBR	114	N-RQ (E Roosevelt)	
	1431	S-FA (Ashland)	W Taylor St
SBT	1317	S-TQ (S Ashland)	
	1787	S-FD (Ashland)	W 13th St
	12	S-FA-BUS (Ashland)	W Taylor St
	12	S-TQ-BUS (Ashland)	
	12	S-FD-BUS (Ashland)	W 13th St
SBR	114	S-RQ (W Roosevelt)	
	1647	W-FA (Roosevelt)	S Loomis St
WBT	1319	W-TQ (W Roosevelt)	
	1433	W-FD (Roosevelt)	S Paulina St
WBL	201	W-LQ (S Ashland)	
WBR	127	W-RQ (N Ashland)	
	1722	E-FA (Roosevelt)	S Paulina St
EBT	1337	E-TQ (E Roosevelt)	
	1451	E-FD (Roosevelt)	S Loomis St
EBL	116	E-LQ (N Ashland)	
EBR	269	E-RQ (S Ashland)	
Total Volume	5395	(excluding buses)	

MOVES Link Importer (PM Peak) 1094 W Roosevelt Rd 4:45 PM peak hour

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	linkDescription	linkAvgGrade	Comments
1	17031	170310	5	0.120478	601	10.5	N-FA (Ashland)	0	
2	17031	170310	5	0.120478	601	0	N-TQ (N Ashland)	0	Includes NBT, NBR
3	17031	170310	5	0.165851	730	10.5	N-FD (Ashland)	0	
4	17031	170310	5	0.120478	12	15.9	N-FA-BUS (Ashland)	0	
5	17031	170310	5	0.120478	12	0	N-TQ-BUS (Ashland)	0	
6	17031	170310	5	0.120478	12	15.9	N-FD-BUS (Ashland)	0	
7	17031	170310	5	0.165851	1431	1.6	S-FA (Ashland)	0	
8	17031	170310	5	0.165851	1317	0	S-TQ (S Ashland)	0	
9	17031	170310	5	0.120478	1787	1.6	S-FD (Ashland)	0	
10	17031	170310	5	0.120478	12	15.9	S-FA-BUS (Ashland)	0	
11	17031	170310	5	0.120478	12	0	S-TQ-BUS (Ashland)	0	
12	17031	170310	5	0.120478	12	15.9	S-FD-BUS (Ashland)	0	
13	17031	170310	5	0.165851	114	0	S-RQ (W Roosevelt)	0	
14	17031	170310	5	0.251755	1647	1.8	W-FA (Roosevelt)	0	
15	17031	170310	5	0.251755	1319	0	W-TQ (W Roosevelt)	0	
16	17031	170310	5	0.131731	1433	1.8	W-FD (Roosevelt)	0	
17	17031	170310	5	0.251755	201	0	W-LQ (S Ashland)	0	
18	17031	170310	5	0.251755	127	0	W-RQ (N Ashland)	0	
19	17031	170310	5	0.131731	1722	1.8	E-FA (Roosevelt)	0	
20	17031	170310	5	0.131731	1337	0	E-TQ (E Roosevelt)	0	
21	17031	170310	5	0.251755	1451	1.8	E-FD (Roosevelt)	0	
22	17031	170310	5	0.131731	116	0	E-LQ (N Ashland)	0	
23	17031	170310	5	0.131731	269	0	E-RQ (S Ashland)	0	
				Total Volume	5395	(excluding buses)			

Data Sources:
Volumes □Ashland PM Existing Synchro Lanes Volumes Timing Report 2013-05-02.pdf
Ashland Avenue Arterial Speeds □Ashland PM Arterial LOS 2013-05-02.pdf
Crossroad Speeds: Ashland PM Arterial LOS Cross Streets 2013-05-03.pdf

Legend

▨	Estimated queue length
🟧	Contains bus volume
🟦	New project links
Calculated Value	

Peak Bus Volume

Local	3
BRT	12

Ashland Avenue (non-BRT)

	Volume	Fraction
Cars	4,959	0.9186736
Trucks	436	0.0807707
Buses	3	0.0005558
Total	5398	1
	ok	

Cars Trucks Split

Cars	0.9191844
Trucks	0.0808156
Total	1

		Fraction		
Category	Source Type	Ashland Ave	BRT	Cross Streets
Cars	11	0.005221667	0	0.005224571
Cars	21	0.323954541	0	0.324134683
Cars	31	0.442123031	0	0.442368883
Cars	32	0.147374344	0	0.147456294
Buses	41	0	0	0
Buses	42	0.000555761	1	0
Buses	43	0	0	0
Trucks	51	0.000159094	0	0.000159182
Trucks	52	0.01209112	0	0.012097844
Trucks	53	0.000954562	0	0.000955093
Trucks	54	0.002545499	0	0.002546914
Trucks	61	0.034460802	0	0.034479965
Trucks	62	0.030559579	0	0.030576572
	Total	1	1	1

Link Volume Definitions:
Queue links based on Synchro output reports.
Approach volumes equal to all queue links for each direction (i.e., N-FA □N-TQ □N-LQ □N-RQ)
Departure volumes equal to through queue link plus volumes from directions turning into traffice (e.g., N-FD □N-TQ □E-LQ □W-RQ)

Notes:
No change to truck volume from No Build Alternative
Car volume equal to difference between total non-bus volume and truck volume

Note:
Because MOVES is calculating a gram per vehicle emission factor for queue links, the exact length of the queue is not important.

CTA Ashland Ave BRT

No Build - Intersection 1094 Ashland Ave. & W Roosevelt Rd. - AM Peak

											Queue Traffic Data					
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane
1	N	N-FA	Northbound Ashland Ave Approach		1,323	662	3.5	0	12	10.154						
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	1,085	543	0.0	0	6		100	62	2	20.050	2,757	1,379
3	N	N-FD	Northbound Ashland Ave Departure		1,431	716	3.5	0	12	10.154						
4	N	N-LQ	Left Turn to WB Roosevelt Rd	NBL	130	65	0.0	0	6		100	90	2	20.050	2,949	1,475
5	N	N-RQ	Right Turn to EB Roosevelt Rd	NBR	108	108	0.0	0	3		100	62	2	20.050	1,101	1,101
6	S	S-FA	Southbound Ashland Ave Approach		1,326	663	6.6	0	12	6.923						
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,100	550	0.0	0	6		100	62	2	20.050	3,040	1,520
8	S	S-FD	Southbound Ashland Ave Departure		1,364	682	6.6	0	12	6.923						
9	S	S-LQ	Left Turn to EB Roosevelt Rd	SBL	130	65	0.0	0	6		100	90	2	20.050	3,006	1,503
10	S	S-RQ	Right Turn to WB Roosevelt Rd	SBR	96	96	0.0	0	3		100	62	2	20.050	1,208	1,208
11	W	W-FA	Westbound Roosevelt Rd Approach		2,253	1,127	1.7	0	12	19.022						
12	W	W-TQ	Westbound Roosevelt Rd Queue	WBT	1,861	931	0.0	0	6		100	67	2	20.052	3,129	1,565
13	W	W-FD	Westbound Roosevelt Rd Departure		2,087	1,044	1.7	0	12	19.022						
14	W	W-LQ	Left Turn to SB Ashland Ave	WBL	170	170	0.0	0	3		100	85	2	20.052	1,565	1,565
15	W	W-RQ	Right Turn to NB Ashland Ave	WBR	222	222	0.0	0	3		100	67	2	20.052	1,386	1,386
16	E	E-FA	Eastbound Roosevelt Rd Approach		873	437	13.2	0	12	5.161						
17	E	E-TQ	Eastbound Roosevelt Rd Queue	EBT	655	328	0.0	0	6		100	67	2	20.052	2,983	1,492
18	E	E-FD	Eastbound Roosevelt Rd Departure		893	447	13.2	0	12	5.161						
19	E	E-LQ	Left Turn to NB Ashland Ave	EBL	124	124	0.0	0	3		100	85	2	20.052	1,506	1,506
20	E	E-RQ	Right Turn to SB Ashland Ave	EBR	94	94	0.0	0	3		100	67	2	20.052	1,310	1,310

# Lanes	Green time length s	Yellow time length s
2		
2	35	3
2		
2	7	3
1	35	3
2		
2	35	3
2		
2	7	3
1	35	3
2		
2	30	3
2		
1	12	3
1	30	3
2		
2	30	3
2		
1	12	3
1	30	3

Data in black obtained from traffic reports

Data in blue are calculated values

Mixing zone width for freeflow traffice □ road width □ 6 meters

Mixing zone width for queue traffice □ road width

Lane width 3 m

Signal Type Actuated

Arrival Type Average

Direction Legend

N □ Northbound

S □ Southbound

W □ Westbound

E □ Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1094 Ashland Ave. & W Roosevelt Rd. - PM Peak

											Queue Traffic Data					
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane
1	N	N-FA	Northbound Ashland Ave Approach		1,193	597	7.7	0	12	6.416						
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	871	436	0.0	0	6		100	64	2	20.050	2,973	1,487
3	N	N-FD	Northbound Ashland Ave Departure		1,098	549	7.7	0	12	6.416						
4	N	N-LQ	Left Turn to WB Roosevelt Rd	NBL	161	81	0.0	0	6		100	89	2	20.050	2,977	1,489
5	N	N-RQ	Right Turn to EB Roosevelt Rd	NBR	161	161	0.0	0	3		100	64	2	20.050	1,220	1,220
6	S	S-FA	Southbound Ashland Ave Approach		2,127	1,064	1.5	0	12	21.557						
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,815	908	0.0	0	6		100	64	2	20.050	3,129	1,565
8	S	S-FD	Southbound Ashland Ave Departure		2,205	1,103	1.5	0	12	21.557						
9	S	S-LQ	Left Turn to EB Roosevelt Rd	SBL	212	106	0.0	0	6		100	89	2	20.050	3,096	1,548
10	S	S-RQ	Right Turn to WB Roosevelt Rd	SBR	100	100	0.0	0	3		100	64	2	20.050	1,208	1,208
11	W	W-FA	Westbound Roosevelt Rd Approach		1,476	738	4.0	0	12	9.287						
12	W	W-TQ	Westbound Roosevelt Rd Queue	WBT	1,150	575	0.0	0	6		100	66	2	20.052	3,129	1,565
13	W	W-FD	Westbound Roosevelt Rd Departure		1,411	706	4.0	0	12	9.287						
14	W	W-LQ	Left Turn to SB Ashland Ave	WBL	199	199	0.0	0	3		100	85	2	20.052	1,580	1,580
15	W	W-RQ	Right Turn to NB Ashland Ave	WBR	127	127	0.0	0	3		100	66	2	20.052	1,414	1,414
16	E	E-FA	Eastbound Roosevelt Rd Approach		1,239	620	5.4	0	12	7.722						
17	E	E-TQ	Eastbound Roosevelt Rd Queue	EBT	948	474	0.0	0	6		100	66	2	20.052	3,160	1,580
18	E	E-FD	Eastbound Roosevelt Rd Departure		1,321	661	5.4	0	12	7.722						
19	E	E-LQ	Left Turn to NB Ashland Ave	EBL	100	100	0.0	0	3		100	85	2	20.052	1,596	1,596
20	E	E-RQ	Right Turn to SB Ashland Ave	EBR	191	191	0.0	0	3		100	66	2	20.052	1,400	1,400

# Lanes	Green time length s	Yellow time length s
2		
2	33	3
2		
2	8	3
1	33	3
2		
2	33	3
2		
2	8	3
1	33	3
2		
2	31	3
2		
1	12	3
1	31	3
2		
2	31	3
2		
1	12	3
1	31	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □ road width □ 6 meters
Mixing zone width for queue traffice □ road width

Lane width 3 m
Signal Type Actuated
Arrival Type Average

Direction Legend
N □ Northbound
S □ Southbound
W □ Westbound
E □ Eastbound

CTA Ashland Ave BRT
Build - Intersection 1094 Ashland Ave. & W Roosevelt Rd. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		753	753	1.7	0	9	19.124							1		
2	N	N-TQ	Northbound Ashland Ave Queue		753	753	0.0	0	3		130	74	2	20.032	1,326	1,326	1	53	3
3	N	N-FD	Northbound Ashland Ave Departure		1,012	1,012	1.7	0	9	19.124							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	15.9	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0.0	0	3		130	74	2	18.569	1,326	1,326	1	53	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	15.9	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		887	887	3.2	0	9	10.856							1		
8	S	S-TQ	Southbound Ashland Ave Queue		797	797	0.0	0	3		130	74	2	20.032	1,600	1,600	1	53	3
9	S	S-FD	Southbound Ashland Ave Departure		1,090	1,090	3.2	0	9	10.856							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	15.9	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0.0	0	3		130	74	2	18.569	1,600	1,600	1	53	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	15.9	0	9	2.116							1		
13	S	S-RQ	Right Turn to WB Roosevelt Rd		90	90	0.0	0	3		130	74	2	20.033	1,221	1,221	1	53	3
14	W	W-FA	Westbound Roosevelt Rd Approach		2,525	1,263	2.7	0	12	12.277							2		
15	W	W-TQ	Westbound Roosevelt Rd Queue		2,103	1051.5	0.0	0	6		130	70	2	20.033	3,129	1,565	2	57	3
16	W	W-FD	Westbound Roosevelt Rd Departure		2,193	1,097	2.7	0	12	12.277							2		
17	W	W-LQ	Left Turn to SB Ashland Ave		171	171	0.0	0	3		130	113	2	20.033	1,565	1,565	1	14	3
18	W	W-RQ	Right Turn to NB Ashland Ave		251	251	0.0	0	3		130	70	2	20.033	1,386	1,386	1	57	3
19	E	E-FA	Eastbound Roosevelt Rd Approach		1,104	552	12.8	0	12	5.220							2		
20	E	E-TQ	Eastbound Roosevelt Rd Queue		852	426	0.0	0	6		130	77	2	20.033	3,011	1,506	2	50	3
21	E	E-FD	Eastbound Roosevelt Rd Departure		974	487	12.8	0	12	5.220							2		
22	E	E-LQ	Left Turn to NB Ashland Ave		130	130	0.0	0	3		130	120	2	20.033	1,506	1,506	1	7	3
23	E	E-RQ	Right Turn to SB Ashland Ave		122	122	0.0	0	3		130	77	2	20.033	1,310	1,310	1	50	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width	3 m
Signal Type	Actuated
Arrival Type	Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
Build - Intersection 1094 Ashland Ave. & W Roosevelt Rd. - PM Peak

											Queue Traffic Data								
Link ID	**Direction**	**ID**	**Description**	**Synchro Link**	**Total Volume**	**Volume per Lane**	**Speed**	**Link Height**	**Mixing Zone Width**	**Freeflow Emission Factor**	**Average signal cycle length**	**Average red time length**	**Clearance lost time**	**Idle Emission Factor**	**Total Sat. Flow**	**Saturation Flow Rate**	**# Lanes**	**Green time length**	**Yellow time length**
							mph	**m**	**m**	**g/v-mi**	**s**	**s**	**s**	**g/v-hr**	**v/hr**	**v/hr/lane**		**s**	**s**
1	N	N-FA	Northbound Ashland Ave Approach		601	601	11	0	9	5.614							1		
2	N	N-TQ	Northbound Ashland Ave Queue		601	601	0	0	3		110	51	2	20.028	1,408	1,408	1	56	3
3	N	N-FD	Northbound Ashland Ave Departure		730	730	11	0	9	5.614							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		110	51	2	18.569	1,408	1,408	1	56	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		1,431	1,431	2	0	9	20.345							1		
8	S	S-TQ	Southbound Ashland Ave Queue		1,317	1,317	0	0	3		110	51	2	20.028	1,562	1,562	1	56	3
9	S	S-FD	Southbound Ashland Ave Departure		1,787	1,787	2	0	9	20.345							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	15.9	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		110	51	2	18.569	1,562	1,562	1	56	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	S	S-RQ	Right Turn to WB Roosevelt Rd		114	114	0	0	3		110	51	2	20.029	1,183	1,183	1	56	3
14	W	W-FA	Westbound Roosevelt Rd Approach		1,647	824	2	0	12	18.084							2		
15	W	W-TQ	Westbound Roosevelt Rd Queue		1319	659.5	0	0	6		110	73	2	20.029	3,129	1,565	2	34	3
16	W	W-FD	Westbound Roosevelt Rd Departure		1,433	717	2	0	12	18.084							2		
17	W	W-LQ	Left Turn to SB Ashland Ave		201	201	0	0	3		110	100	2	20.029	1,580	1,580	1	7	3
18	W	W-RQ	Right Turn to NB Ashland Ave		127	127	0	0	3		110	73	2	20.029	1,414	1,414	1	34	3
19	E	E-FA	Eastbound Roosevelt Rd Approach		1,722	861	2	0	12	18.084							2		
20	E	E-TQ	Eastbound Roosevelt Rd Queue		1,337	669	0	0	6		110	73	2	20.029	3,160	1,580	2	34	3
21	E	E-FD	Eastbound Roosevelt Rd Departure		1,451	726	2	0	12	18.084							2		
22	E	E-LQ	Left Turn to NB Ashland Ave		116	116	0	0	3		110	100	2	20.029	1,596	1,596	1	7	3
23	E	E-RQ	Right Turn to SB Ashland Ave		269	269	0	0	3		110	73	2	20.029	1,580	1,580	1	34	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width	3 m
Signal Type	Actuated
Arrival Type	Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1018 Ashland Ave. & W Diversey Pkwy. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		1,106	553	19.9	0	12	4.425							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	978	489	0.0	0	6		85	43	2	20.049	3,090	1,545	2	39	3
3	N	N-FD	Northbound Ashland Ave Departure		1,226	613	19.9	0	12	4.425							2		
4	N	N-LQ	Left Turn to EB Diversey Pkwy	NBL	12	12	0.0	0	3		85	43	2	20.049	1,653	1,653	1	39	3
5	N	N-RQ	Right Turn to EB Diversey Pkwy	NBR	116	116	0.0	0	3		85	43	2	20.049	1,241	1,241	1	39	3
6	S	S-FA	Southbound Ashland Ave Approach		2,030	1,015	4.2	0	12	8.995							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,950	975	0.0	0	6		85	43	2	20.049	3,203	1,602	2	39	3
8	S	S-FD	Southbound Ashland Ave Departure		2,055	1,028	4.2	0	12	8.995							2		
9	S	S-LQ	Left Turn to EB Diversey Pkwy	SBL	80	80	0.0	0	3		85	43	2	20.049	1,574	1,574	1	39	3
10	W	W-FA	Westbound Diversey Pkwy Approach		645	645	8.0	0	9	6.305							1		
11	W	W-TQ	Westbound Diversey Pkwy Queue	WBT	449	449	0.0	0	3		85	53	2	20.052	1,647	1,647	1	29	3
12	W	W-FD	Westbound Diversey Pkwy Departure		563	563	8.0	0	9	6.305							1		
13	W	W-LQ	Left Turn to SB Ashland Ave	WBL	132	132	0.0	0	3		85	76	2	20.052	1,565	1,565	1	6	3
14	W	W-RQ	Right Turn to NB Ashland Ave	WBR	64	64	0.0	0	3		85	53	2	20.052	1,337	1,337	1	29	3
15	E	E-FA	Eastbound Diversey Pkwy Approach		942	942	2.5	0	9	12.935							1		
16	E	E-TQ	Eastbound Diversey Pkwy Queue	EBT	683	683	0.0	0	3		85	53	2	20.052	1,615	1,615	1	29	3
17	E	E-FD	Eastbound Diversey Pkwy Departure		879	879	2.5	0	9	12.935							1		
18	E	E-LQ	Left Turn to NB Ashland Ave	EBL	184	184	0.0	0	3		85	76	2	20.052	1,535	1,535	1	6	3
19	E	E-RQ	Right Turn to SB Ashland Ave	EBR	75	75	0.0	0	3		85	53	2	20.052	1,337	1,337	1	29	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □ road width □ 6 meters
Mixing zone width for queue traffice □ road width

Lane width	3 m
Signal Type	Pretimed
Arrival Type	Average

Direction Legend
N □ Northbound
S □ Southbound
W □ Westbound
E □ Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1018 Ashland Ave. & W Diversey Pkwy. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed	Link Height	Mixing Zone Width	Freeflow Emission Factor	Average signal cycle length	Average red time length	Clearance lost time	Idle Emission Factor	Total Sat. Flow	Saturation Flow Rate	# Lanes	Green time length	Yellow time length
							mph	m	m	g/v-mi	s	s	s	g/v-hr	v/hr	v/hr/lane		s	s
1	N	N-FA	Northbound Ashland Ave Approach		1,624	812	4.0	0	12	9.285							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	1,477	739	0.0	0	6		85	43	2	20.049	2,380	1,190	2	39	3
3	N	N-FD	Northbound Ashland Ave Departure		1,737	869	4.0	0	12	9.285							2		
4	N	N-LQ	Left Turn to EB Diversey Pkwy	NBL	18	18	0.0	0	3		85	43	2	20.049	1,653	1,653	1	39	3
5	N	N-RQ	Right Turn to EB Diversey Pkwy	NBR	129	129	0.0	0	3		85	43	2	20.049	581	581	1	39	3
6	S	S-FA	Southbound Ashland Ave Approach		1,818	909	4.5	0	12	8.609							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,748	874	0.0	0	6		85	43	2	20.049	2,927	1,464	2	39	3
8	S	S-FD	Southbound Ashland Ave Departure		1,837	919	4.5	0	12	8.609							2		
9	S	S-LQ	Left Turn to EB Diversey Pkwy	SBL	70	70	0.0	0	3		85	43	2	20.049	1,653	1,653	1	39	3
10	W	W-FA	Westbound Diversey Pkwy Approach		800	800	5.0	0	9	8.077							1		
11	W	W-TQ	Westbound Diversey Pkwy Queue	WBT	561	561	0.0	0	3		85	53	2	20.052	1,647	1,647	1	29	3
12	W	W-FD	Westbound Diversey Pkwy Departure		678	678	5.0	0	9	8.077							1		
13	W	W-LQ	Left Turn to SB Ashland Ave	WBL	148	148	0.0	0	3		85	76	2	20.052	1,580	1,580	1	6	3
14	W	W-RQ	Right Turn to NB Ashland Ave	WBR	91	91	0.0	0	3		85	53	2	20.052	1,377	1,377	1	29	3
15	E	E-FA	Eastbound Diversey Pkwy Approach		697	697	7.1	0	9	6.676							1		
16	E	E-TQ	Eastbound Diversey Pkwy Queue	EBT	488	488	0.0	0	3		85	53	2	20.052	1,647	1,647	1	29	3
17	E	E-FD	Eastbound Diversey Pkwy Departure		687	687	7.1	0	9	6.676							1		
18	E	E-LQ	Left Turn to NB Ashland Ave	EBL	169	169	0.0	0	3		85	76	2	20.052	1,596	1,596	1	6	3
19	E	E-RQ	Right Turn to SB Ashland Ave	EBR	40	40	0.0	0	3		85	53	2	20.052	1,311	1,311	1	29	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width	3 m
Signal Type	Pretimed
Arrival Type	Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
Build - Intersection 1018 Ashland Ave. & W Diversey Pkwy. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		691	691	2	0	9	15.711							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	691	691	0	0	3		130	54	2	19.979	692	692	1	73	3
3	N	N-FD	Northbound Ashland Ave Departure		859	859	2	0	9	15.711							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		130	54	2	18.569	692	692	1	73	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		1,065	1,065	4	0	9	9.928							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,065	1,065	0	0	3		130	54	2	19.979	1,368	1,368	1	73	3
9	S	S-FD	Southbound Ashland Ave Departure		1,208	1,208	4	0	9	9.928							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		130	54	2	18.569	1,368	1,368	1	73	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	W	W-FA	Westbound Diversey Pkwy Approach		696	696	4	0	9	10.118							1		
14	W	W-TQ	Westbound Diversey Pkwy Queue	WBT	492	492	0	0	3		130	86	2	19.980	1,647	1,647	1	41	3
15	W	W-FD	Westbound Diversey Pkwy Departure		560	560	4	0	9	10.118							1		
16	W	W-LQ	Left Turn to SB Ashland Ave	WBL	136	136	0	0	3		130	119	2	19.980	1,580	1,580	1	8	3
17	W	W-RQ	Right Turn to NB Ashland Ave	WBR	68	68	0	0	3		130	86	2	19.980	1,337	1,337	1	41	3
18	E	E-FA	Eastbound Diversey Pkwy Approach		1,039	1,039	1	0	9	23.566							1		
19	E	E-TQ	Eastbound Diversey Pkwy Queue	EBT	780	780	0	0	3		130	82	2	19.980	1,615	1,615	1	45	3
20	E	E-FD	Eastbound Diversey Pkwy Departure		864	864	1	0	9	23.566							1		
21	E	E-LQ	Left Turn to NB Ashland Ave	EBL	184	184	0	0	3		130	115	2	19.980	1,535	1,535	1	12	3
22	E	E-RQ	Right Turn to SB Ashland Ave	EBR	75	75	0	0	3		130	82	2	19.980	1,337	1,337	1	45	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width 3 m
Signal Type Pretimed
Arrival Type Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
Build - Intersection 1018 Ashland Ave. & W Diversey Pkwy. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		862	862	2	0	9	19.313							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	862	862	0	0	3		110	45	2	19.997	744	744	1	62	3
3	N	N-FD	Northbound Ashland Ave Departure		1,035	1,035	2	0	9	19.313							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		110	45	2	18.569	744	744	1	62	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		1,303	1,303	2	0	9	13.680							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,303	1,303	0	0	3		110	45	2	19.997	1,383	1,383	1	62	3
9	S	S-FD	Southbound Ashland Ave Departure		1,410	1,410	2	0	9	13.680							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		110	45	2	18.569	1,383	1,383	1	62	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	W	W-FA	Westbound Diversey Pkwy Approach		945	945	2	0	9	20.520							1		
14	W	W-TQ	Westbound Diversey Pkwy Queue	WBT	701	701	0	0	3		110	75	2	19.998	1,647	1,647	1	32	3
15	W	W-FD	Westbound Diversey Pkwy Departure		786	786	2	0	9	20.520							1		
16	W	W-LQ	Left Turn to SB Ashland Ave	WBL	152	152	0	0	3		110	102	2	19.998	1,580	1,580	1	5	3
17	W	W-RQ	Right Turn to NB Ashland Ave	WBR	92	92	0	0	3		110	75	2	19.998	1,377	1,377	1	32	3
18	E	E-FA	Eastbound Diversey Pkwy Approach		791	791	3	0	9	13.133							1		
19	E	E-TQ	Eastbound Diversey Pkwy Queue	EBT	582	582	0	0	3		110	75	2	19.998	1,647	1,647	1	32	3
20	E	E-FD	Eastbound Diversey Pkwy Departure		670	670	3	0	9	13.133							1		
21	E	E-LQ	Left Turn to NB Ashland Ave	EBL	169	169	0	0	3		110	102	2	19.998	1,596	1,596	1	5	3
22	E	E-RQ	Right Turn to SB Ashland Ave	EBR	40	40	0	0	3		110	75	2	19.998	1,311	1,311	1	32	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice road width 6 meters
Mixing zone width for queue traffice road width

Lane width 3 m
Signal Type Pretimed
Arrival Type Average

Direction Legend
N Northbound
S Southbound
W Westbound
E Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1011 Ashland Ave. & N. Lincoln Ave. & W Belmont Ave. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		1,079	540	5.9	0	12	7.343							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	920	460	0.0	0	6		100	65	2	20.049	3,040	1,520	2	31	4
3	N	N-FD	Northbound Ashland Ave Departure		1,022	511	5.9	0	12	7.343							2		
4	N	N-LQ	Left Turn to EB Belmont□NB Lincoln Ave	NBL	69	69	0.0	0	3		100	65	2	20.049	1,462	1,462	1	31	4
5	N	N-RQ	Right Turn to SB Lincoln□EB Belmont Av	NBR	90	90	0.0	0	3		100	65	2	20.049	1,373	1,373	1	31	4
6	S	S-FA	Southbound Ashland Ave Approach		1,120	560	4.9	0	12	8.171							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,018	509	0.0	0	6		100	65	2	20.049	3,198	1,599	2	31	4
8	S	S-FD	Southbound Ashland Ave Departure		1,167	584	4.9	0	12	8.171							2		
9	S	S-LQ	Left Turn to EB Belmont□SB Lincoln Ave	SBL	102	102	0.0	0	3		100	65	2	20.049	1,710	1,710	1	31	4
10	W	W-FA	Westbound Belmont Ave Approach		415	415	8.0	0	9	6.305							1		
11	W	W-TQ	Westbound Belmont Ave Queue	WBT	238	238	0.0	0	3		100	70	2	20.052	1,279	1,279	1	27	3
12	W	W-FD	Westbound Belmont Ave Departure		273	273	8.0	0	9	6.305							1		
13	W	W-RQ	Right Turn to NB Ashland□NB Lincoln Av	WBL	177	177	0.0	0	3		100	70	2	20.052	1,706	1,706	1	27	3
14	E	E-FA	Eastbound Belmont Ave Approach		527	527	2.1	0	9	15.399							1		
15	E	E-TQ	Eastbound Belmont Ave Queue	EBT	527	527	0.0	0	3		100	70	2	20.052	1,490	1,490	1	27	3
16	E	E-FD	Eastbound Belmont Ave Departure		520	520	2.1	0	9	15.399							1		
17	SE	SE-FA	Southbound Lincoln Ave Approach		491	491	3.1	0	9	11.052							1		
18	SE	SE-TQ	Southbound Lincoln Ave Queue	SET	456	456	0.0	0	3		100	71	2	20.052	1,616	1,616	1	25	4
19	SE	SE-FD	Southbound Lincoln Ave Departure		533	533	3.1	0	9	11.052							1		
20	SE	SE-LQ	Left Turn to NB Lincoln□EB Belmont Ave	SEL	35	35	0.0	0	3		100	71	2	20.052	1,386	1,386	1	25	4
21	NW	NW-FA	Northbound Lincoln Ave Approach		350	350	6.7	0	9	6.873							1		
22	NW	NW-TQ	Northbound Lincoln Ave Queue	NWT	324	324	0.0	0	3		100	71	2	20.052	1,674	1,674	1	25	4
23	NW	NW-FD	Northbound Lincoln Ave Departure		467	467	6.7	0	9	6.873							1		
24	NW	NW-LQ	Left Turn to SB Ashland□WB Belmont Av	NWL	26	26	0.0	0	3		100	71	2	20.052	1,539	1,539	1	25	4

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □ road width □ 6 meters
Mixing zone width for queue traffice □ road width

Lane width	3 m
Signal Type	Pretimed
Arrival Type	Average

Direction Legend
N □ Northbound
S □ Southbound
W □ Westbound
E □ Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1011 Ashland Ave. & N. Lincoln Ave. & W Belmont Ave. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		1,146	573	4.0	0	12	9.285							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	954	477	0.0	0	6		100	65	2	20.049	2,813	1,407	2	31	4
3	N	N-FD	Northbound Ashland Ave Departure		1,119	560	4.0	0	12	9.285							2		
4	N	N-LQ	Left Turn to EB Belmont□NB Lincoln Ave	NBL	94	94	0.0	0	3		100	65	2	20.049	1,653	1,653	1	31	4
5	N	N-RQ	Right Turn to SB Lincoln□EB Belmont Av	NBR	98	98	0.0	0	3		100	65	2	20.049	1,078	1,078	1	31	4
6	S	S-FA	Southbound Ashland Ave Approach		1,002	501	5.8	0	12	7.412							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	899	450	0.0	0	6		100	65	2	20.049	3,004	1,502	2	31	4
8	S	S-FD	Southbound Ashland Ave Departure		1,006	503	5.8	0	12	7.412							2		
9	S	S-LQ	Left Turn to EB Belmont□SB Lincoln Ave	SBL	103	103	0.0	0	3		100	65	2	20.049	1,710	1,710	1	31	4
10	W	W-FA	Westbound Belmont Ave Approach		534	534	5.9	0	9	7.348							1		
11	W	W-TQ	Westbound Belmont Ave Queue	WBT	315	315	0.0	0	3		100	70	2	20.052	1,345	1,345	1	27	3
12	W	W-FD	Westbound Belmont Ave Departure		401	401	5.9	0	9	7.348							1		
13	W	W-RQ	Right Turn to NB Ashland□NB Lincoln Av	WBL	219	219	0.0	0	3		100	70	2	20.052	1,721	1,721	1	27	3
14	E	E-FA	Eastbound Belmont Ave Approach		442	442	4.0	0	9	9.287							1		
15	E	E-TQ	Eastbound Belmont Ave Queue	EBT	442	442	0.0	0	3		100	70	2	20.052	1,594	1,594	1	27	3
16	E	E-FD	Eastbound Belmont Ave Departure		526	526	4.0	0	9	9.287							1		
17	SE	SE-FA	Southbound Lincoln Ave Approach		397	397	6.0	0	9	7.281							1		
18	SE	SE-TQ	Southbound Lincoln Ave Queue	SET	349	349	0.0	0	3		100	71	2	20.052	1,640	1,640	1	25	4
19	SE	SE-FD	Southbound Lincoln Ave Departure		381	381	6.0	0	9	7.281							1		
20	SE	SE-LQ	Left Turn to NB Lincoln□EB Belmont Ave	SEL	48	48	0.0	0	3		100	71	2	20.052	1,539	1,539	1	25	4
21	NW	NW-FA	Northbound Lincoln Ave Approach		410	410	5.7	0	9	7.489							1		
22	NW	NW-TQ	Northbound Lincoln Ave Queue	NWT	364	364	0.0	0	3		100	71	2	20.052	1,661	1,661	1	25	4
23	NW	NW-FD	Northbound Lincoln Ave Departure		498	498	5.7	0	9	7.489							1		
24	NW	NW-LQ	Left Turn to SB Ashland□WB Belmont Av	NWL	46	46	0.0	0	3		100	71	2	20.052	1,508	1,508	1	25	4

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □ road width □ 6 meters
Mixing zone width for queue traffice □ road width

Lane width 3 m
Signal Type Pretimed
Arrival Type Average

Direction Legend
N □ Northbound
S □ Southbound
W □ Westbound
E □ Eastbound

CTA Ashland Ave BRT

Build - Intersection 1011 Ashland Ave. & N. Lincoln Ave. & W Belmont Ave. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		702	702	2	0	9	20.462							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	702	702	0	0	3		130	76	2	20.007	1,207	1,207	1	50	4
3	N	N-FD	Northbound Ashland Ave Departure		727	727	2	0	9	20.462							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		130	76	2	18.569	1,207	1,207	1	50	4
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		597	597	5	0	9	8.035							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	597	597	0	0	3		130	76	2	20.007	1,498	1,498	1	50	4
9	S	S-FD	Southbound Ashland Ave Departure		709	709	5	0	9	8.035							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		130	76	2	18.569	1,498	1,498	1	50	4
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	W	W-FA	Westbound Belmont Ave Approach		484	484	7	0	9	6.661							1		
14	W	W-TQ	Westbound Belmont Ave Queue	WBT	307	307	0	0	3		130	88	2	20.008	1,673	1,673	1	39	3
15	W	W-FD	Westbound Belmont Ave Departure		378	378	7	0	9	6.661							1		
16	W	W-RQ	Right Turn to NB Ashland NB Lincoln Av	WBL	177	177	0	0	3		130	88	2	20.008	1,279	1,279	1	39	3
17	E	E-FA	Eastbound Belmont Ave Approach		641	641	2	0	9	19.259							1		
18	E	E-TQ	Eastbound Belmont Ave Queue	EBT	641	641	0	0	3		130	88	2	20.008	1,519	1,519	1	39	3
19	E	E-FD	Eastbound Belmont Ave Departure		601	601	2	0	9	19.259							1		
20	SE	SE-FA	Southbound Lincoln Ave Approach		501	501	1	0	9	23.386							1		
21	SE	SE-TQ	Southbound Lincoln Ave Queue	SET	465	465	0	0	3		130	102	2	20.008	1,616	1,616	1	24	4
22	SE	SE-FD	Southbound Lincoln Ave Departure		456	456	1	0	9	23.386							1		
23	SE	SE-LQ	Left Turn to NB Lincoln EB Belmont Ave	SEL	36	36	0	0	3		130	102	2	20.008	1,386	1,386	1	24	4
24	NW	NW-FA	Northbound Lincoln Ave Approach		339	339	4	0	9	10.255							1		
25	NW	NW-TQ	Northbound Lincoln Ave Queue	NWT	314	314	0	0	3		130	102	2	20.008	1,674	1,674	1	24	4
26	NW	NW-FD	Northbound Lincoln Ave Departure		393	393	4	0	9	10.255							1		
27	NW	NW-LQ	Left Turn to SB Ashland WB Belmont Av	NWL	25	25	0	0	3		130	102	2	20.008	1,539	1,539	1	24	4

Data in black obtained from traffic reports
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Mixing zone width for freeflow traffice road width 6 meters
Mixing zone width for queue traffice road width

Lane width	3	m
Signal Type	Pretimed	
Arrival Type	Average	

Direction Legend
N Northbound
S Southbound
W Westbound
E Eastbound

CTA Ashland Ave BRT
Build - Intersection 1011 Ashland Ave. & N. Lincoln Ave. & W Belmont Ave. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		689	689	2	0	9	18.165							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	689	689	0	0	3		110	63	2	20.011	1,216	1,216	1	43	4
3	N	N-FD	Northbound Ashland Ave Departure		771	771	2	0	9	18.165							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		110	63	2	18.569	1,216	1,216	1	43	4
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		544	544	8	0	9	6.326							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	544	544	0	0	3		110	63	2	20.011	1,450	1,450	1	43	4
9	S	S-FD	Southbound Ashland Ave Departure		631	631	8	0	9	6.326							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		110	63	2	18.569	1,450	1,450	1	43	4
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	W	W-FA	Westbound Belmont Ave Approach		650	650	2	0	9	19.233							1		
14	W	W-TQ	Westbound Belmont Ave Queue	WBT	405	405	0	0	3		110	75	2	20.013	1,723	1,723	1	32	3
15	W	W-FD	Westbound Belmont Ave Departure		512	512	2	0	9	19.234							1		
16	W	W-RQ	Right Turn to NB Ashland□NB Lincoln Av	WBL	245	245	0	0	3		110	75	2	20.013	1,346	1,346	1	32	3
17	E	E-FA	Eastbound Belmont Ave Approach		570	570	3	0	9	13.079							1		
18	E	E-TQ	Eastbound Belmont Ave Queue	EBT	570	570	0	0	3		110	75	2	20.013	1,609	1,609	1	32	3
19	E	E-FD	Eastbound Belmont Ave Departure		611	611	3	0	9	13.079							1		
20	SE	SE-FA	Southbound Lincoln Ave Approach		429	429	2	0	9	19.233							1		
21	SE	SE-TQ	Southbound Lincoln Ave Queue	SET	377	377	0	0	3		110	88	2	20.013	1,640	1,640	1	18	4
22	SE	SE-FD	Southbound Lincoln Ave Departure		332	332	2	0	9	19.233							1		
23	SE	SE-LQ	Left Turn to NB Lincoln□EB Belmont Ave	SEL	52	52	0	0	3		110	88	2	20.013	1,539	1,539	1	18	4
24	NW	NW-FA	Northbound Lincoln Ave Approach		410	410	2	0	9	17.209							1		
25	NW	NW-TQ	Northbound Lincoln Ave Queue	NWT	364	364	0	0	3		110	88	2	20.013	1,661	1,661	1	18	4
26	NW	NW-FD	Northbound Lincoln Ave Departure		435	435	2	0	9	17.209							1		
27	NW	NW-LQ	Left Turn to SB Ashland□WB Belmont Av	NWL	46	46	0	0	3		110	88	2	20.013	1,508	1,508	1	18	4

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □ road width □ 6 meters
Mixing zone width for queue traffice □ road width

Lane width 3 m
Signal Type Pretimed
Arrival Type Average

Direction Legend
N □ Northbound
S □ Southbound
W □ Westbound
E □ Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1001 Ashland Ave. & W Irving Park Rd. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		1,006	503	16.2	0	12	4.833							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	800	400	0.0	0	6		90	56	2	20.049	3,129	1,565	2	31	3
3	N	N-FD	Northbound Ashland Ave Departure		1,054	527	16.2	0	12	4.833							2		
4	N	N-LQ	Left Turn to WB Irving Park Rd	NBL	106	106	0.0	0	3		90	81	2	20.049	1,676	1,676	1	6	3
5	N	N-RQ	Right Turn to EB Irving Park Rd	NBR	100	100	0.0	0	3		90	56	2	20.049	1,299	1,299	1	31	3
6	S	S-FA	Southbound Ashland Ave Approach		1,159	580	7.8	0	12	6.375							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	942	471	0.0	0	6		90	56	2	20.049	3,160	1,580	2	31	3
8	S	S-FD	Southbound Ashland Ave Departure		1,202	601	7.8	0	12	6.375							2		
9	S	S-LQ	Left Turn to EB Irving Park Rd	SBL	78	78	0.0	0	3		90	81	2	20.049	1,750	1,750	1	6	3
10	S	S-RQ	Right Turn to WB Irving Park Rd	SBR	139	139	0.0	0	3		90	56	2	20.049	1,350	1,350	1	31	3
11	W	W-FA	Westbound Irving Park Rd Approach		992	496	8.8	0	12	6.039							2		
12	W	W-TQ	Westbound Irving Park Rd Queue	WBT	865	433	0.0	0	6		90	56	2	20.052	3,101	1,551	2	31	3
13	W	W-FD	Westbound Irving Park Rd Departure		1,071	536	8.8	0	12	6.039							2		
14	W	W-LQ	Left Turn to SB Ashland Ave	WBL	127	127	0.0	0	3		90	81	2	20.052	1,550	1,550	1	6	3
15	E	E-FA	Eastbound Irving Park Rd Approach		1,191	596	9.0	0	12	5.980							2		
16	E	E-TQ	Eastbound Irving Park Rd Queue	EBT	843	422	0.0	0	6		90	56	2	20.052	3,040	1,520	2	31	3
17	E	E-FD	Eastbound Ashland Ave Departure		1,021	511	9.0	0	12	5.980							2		
18	E	E-LQ	Left Turn to NB Ashland Ave	EBL	215	215	0.0	0	3		90	81	2	20.052	1,565	1,565	1	6	3
19	E	E-RQ	Right Turn to SB Ashland Ave	EBR	133	133	0.0	0	3		90	56	2	20.052	1,360	1,360	1	31	3

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width	3 m
Signal Type	Actuated
Arrival Type	Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1001 Ashland Ave. & W Irving Park Rd. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		1,143	572	14.4	0	12	5.011							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	925	463	0.0	0	6		90	56	2	20.049	2,745	1,373	2	31	3
3	N	N-FD	Northbound Ashland Ave Departure		1,204	602	14.4	0	12	5.011							2		
4	N	N-LQ	Left Turn to WB Irving Park Rd	NBL	106	106	0.0	0	3		90	81	2	20.049	1,660	1,660	1	6	3
5	N	N-RQ	Right Turn to EB Irving Park Rd	NBR	112	112	0.0	0	3		90	56	2	20.049	941	941	1	31	3
6	S	S-FA	Southbound Ashland Ave Approach		1,233	617	6.7	0	12	6.869							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	988	494	0.0	0	6		90	56	2	20.049	2,973	1,487	2	31	3
8	S	S-FD	Southbound Ashland Ave Departure		1,301	651	6.7	0	12	6.869							2		
9	S	S-LQ	Left Turn to EB Irving Park Rd	SBL	79	79	0.0	0	3		90	81	2	20.049	1,716	1,716	1	6	3
10	S	S-RQ	Right Turn to WB Irving Park Rd	SBR	166	166	0.0	0	3		90	56	2	20.049	1,188	1,188	1	31	3
11	W	W-FA	Westbound Irving Park Rd Approach		935	468	9.4	0	12	5.869							2		
12	W	W-TQ	Westbound Irving Park Rd Queue	WBT	802	401	0.0	0	6		90	56	2	20.052	3,139	1,570	2	31	3
13	W	W-FD	Westbound Irving Park Rd Departure		1,023	512	9.4	0	12	5.869							2		
14	W	W-LQ	Left Turn to SB Ashland Ave	WBL	133	133	0.0	0	3		90	81	2	20.052	1,565	1,565	1	6	3
15	E	E-FA	Eastbound Irving Park Rd Approach		1,199	600	9.6	0	12	5.817							2		
16	E	E-TQ	Eastbound Irving Park Rd Queue	EBT	791	396	0.0	0	6		90	56	2	20.052	3,160	1,580	2	31	3
17	E	E-FD	Eastbound Ashland Ave Departure		982	491	9.6	0	12	5.817							2		
18	E	E-LQ	Left Turn to NB Ashland Ave	EBL	228	228	0.0	0	3		90	81	2	20.052	1,596	1,596	1	6	3
19	E	E-RQ	Right Turn to SB Ashland Ave	EBR	180	180	0.0	0	3		90	56	2	20.052	1,414	1,414	1	31	3

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Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width 3 m
Signal Type Actuated
Arrival Type Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
Build - Intersection 1001 Ashland Ave. & W Irving Park Rd. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		644	644	11.6	0	9	5.403							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	644	644	0.0	0	3		130	54	2	20.031	1,114	1,114	1	73	3
3	N	N-FD	Northbound Ashland Ave Departure		827	827	11.6	0	9	5.403							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	15.9	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0.0	0	3		130	54	2	18.569	1,114	1,114	1	73	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	15.9	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		922	922	3.0	0	9	11.370							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	922	922	0.0	0	3		130	54	2	20.031	1,434	1,434	1	73	3
9	S	S-FD	Southbound Ashland Ave Departure		1,077	1,077	3.0	0	9	11.370							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	15.9	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0.0	0	3		130	54	2	18.569	1,434	1,434	1	73	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	15.9	0	9	2.116							1		
13	W	W-FA	Westbound Irving Park Rd Approach		1,110	555	3.2	0	12	10.859							2		
14	W	W-TQ	Westbound Irving Park Rd Queue	WBT	982	491	0.0	0	6		130	91	2	20.032	3,073	1,537	2	36	3
15	W	W-FD	Westbound Irving Park Rd Departure		1,054	527	3.2	0	12	10.859							2		
16	W	W-LQ	Left Turn to SB Ashland Ave	WBL	128	128	0.0	0	3		130	121	2	20.032	1,550	1,550	1	6	3
17	E	E-FA	Eastbound Irving Park Rd Approach		1,276	638	4.4	0	12	8.765							2		
18	E	E-TQ	Eastbound Irving Park Rd Queue	EBT	922	461	0.0	0	6		130	89	2	20.032	3,040	1,520	2	38	3
19	E	E-FD	Eastbound Ashland Ave Departure		994	497	4.4	0	12	8.765							2		
20	E	E-LQ	Left Turn to NB Ashland Ave	EBL	216	216	0.0	0	3		130	119	2	20.032	1,565	1,565	1	8	3
21	E	E-RQ	Right Turn to SB Ashland Ave	EBR	138	138	0.0	0	3		130	89	2	20.032	1,360	1,360	1	38	3

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Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width 3 m
Signal Type Actuated
Arrival Type Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
Build - Intersection 1001 Ashland Ave. & W Irving Park Rd. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		630	630	14	0	9	5.090							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	630	630	0	0	3		110	45	2	20.022	1,180	1,180	1	62	3
3	N	N-FD	Northbound Ashland Ave Departure		842	842	14	0	9	5.090							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		110	45	2	18.569	1,180	1,180	1	62	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		982	982	3	0	9	13.040							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	982	982	0	0	3		110	45	2	20.022	1,442	1,442	1	62	3
9	S	S-FD	Southbound Ashland Ave Departure		1,161	1,161	3	0	9	13.040							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		110	45	2	18.569	1,442	1,442	1	62	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	W	W-FA	Westbound Irving Park Rd Approach		1,059	530	3	0	12	10.881							2		
14	W	W-TQ	Westbound Irving Park Rd Queue	WBT	927	464	0	0	6		110	79	2	20.023	3,133	1,567	2	28	3
15	W	W-FD	Westbound Irving Park Rd Departure		1,008	504	3	0	12	10.881							2		
16	W	W-LQ	Left Turn to SB Ashland Ave	WBL	132	132	0	0	3		110	101	2	20.023	1,565	1,565	1	6	3
17	E	E-FA	Eastbound Irving Park Rd Approach		1,279	640	5	0	12	8.654							2		
18	E	E-TQ	Eastbound Irving Park Rd Queue	EBT	871	436	0	0	6		110	78	2	20.023	3,160	1,580	2	29	3
19	E	E-FD	Eastbound Ashland Ave Departure		939	470	5	0	12	8.654							2		
20	E	E-LQ	Left Turn to NB Ashland Ave	EBL	228	228	0	0	3		110	100	2	20.023	1,596	1,596	1	7	3
21	E	E-RQ	Right Turn to SB Ashland Ave	EBR	180	180	0	0	3		110	78	2	20.023	1,414	1,414	1	29	3

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Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width	3 m
Signal Type	Actuated
Arrival Type	Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1109 Ashland Ave. & W Cermak Rd. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		1,397	699	12.6	0	12	5.236							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	1,114	557	0.0	0	6		130	69	2	20.048	3,119	1,560	2	58	3
3	N	N-FD	Northbound Ashland Ave Departure		1,488	744	12.6	0	12	5.236							2		
4	N	N-LQ	Left Turn to SB Blue Is Ave□WB Cermak	NBL	130	130	0.0	0	3		130	122	2	20.048	1,449	1,449	1	5	3
5	N	N-RQ	Right Turn to W Cermak Rd	NBR	153	153	0.0	0	3		130	69	2	20.048	1,382	1,382	1	58	3
6	S	S-FA	Southbound Ashland Ave Approach		820	410	9.3	0	12	5.889							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	611	306	0.0	0	6		130	77	2	20.048	3,061	1,531	2	50	3
8	S	S-FD	Southbound Ashland Ave Departure		788	394	9.3	0	12	5.889							2		
9	S	S-LQ	Left Turn to EB Cermak Rd	SBL	42	42	0.0	0	3		130	77	2	20.048	1,215	1,215	1	50	3
10	S	S-RQ	Right Turn to WB Cermak Rd□SB Blue I	SBR	167	167	0.0	0	3		130	77	2	20.048	1,232	1,232	1	50	3
11	W	W-FA	Westbound Cemak Rd Approach		586	293	8.1	0	12	6.269							2		
12	W	W-TQ	Westbound Cermak Rd Queue	WBT	402	201	0.0	0	6		130	88	2	20.052	2,716	1,358	2	39	3
13	W	W-FD	Westbound Cemak Rd Departure		431	216	8.1	0	12	6.269							2		
14	W	W-LQ	Left Turn to SB Ashland□SB Blue Is Ave	WBL	184	184	0.0	0	3		130	114	2	20.052	1,341	1,341	1	13	3
15	E	E-FA	Eastbound Cermak Rd Approach		403	202	5.7	0	12	7.489							2		
16	E	E-TQ	Eastbound Cermak Rd Queue	EBT	329	165	0.0	0	6		130	104	2	20.052	3,081	1,541	2	23	3
17	E	E-FD	Eastbound Cermak Rd Departure		665	333	5.7	0	12	7.489							2		
18	E	E-LQ	Left Turn to NB Ashland Ave	EBL	74	74	0.0	0	3		130	104	2	20.052	1,425	1,425	1	23	3
19	N	NE-FA	Northbound Blue Island Ave Approach		423	423	4.2	0	9	8.998							1		
20	N	NE-LQ	Left Turn to WB Cemak Rd□NB Ashland	NEL	196	196	0.0	0	3		130	106	2	20.052	1,401	1,401	1	21	3
21	N	NE-RQ	Right Turn to SB Ashland Ave□EB Cema	NER	227	227	0.0	0	3		130	106	2	20.052	1,327	1,327	1	21	3
22	N	SW-FD	Southbound Blue Island Ave Departure		257	257	4.2	0	9	8.998							1		

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Mixing zone width for freeflow traffice □ road width □ 6 meters
Mixing zone width for queue traffice □ road width

Lane width	3 m
Signal Type	Actuated
Arrival Type	Average

Direction Legend
N □ Northbound
S □ Southbound
W □ Westbound
E □ Eastbound

CTA Ashland Ave BRT
No Build - Intersection 1109 Ashland Ave. & W Cermak Rd. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		950	475	14.6	0	12	4.988							2		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	765	383	0.0	0	6		130	65	2	20.048	2,455	1,228	2	62	3
3	N	N-FD	Northbound Ashland Ave Departure		987	494	14.6	0	12	4.988							2		
4	N	N-LQ	Left Turn to SB Blue Is Ave□WB Cermak	NBL	94	94	0.0	0	3		130	122	2	20.048	1,528	1,528	1	5	3
5	N	N-RQ	Right Turn to W Cermak Rd	NBR	91	91	0.0	0	3		130	65	2	20.048	684	684	1	62	3
6	S	S-FA	Southbound Ashland Ave Approach		1,393	697	7.0	0	12	6.718							2		
7	S	S-TQ	Southbound Ashland Ave Queue	SBT	1,112	556	0.0	0	6		130	73	2	20.048	2,944	1,472	2	54	3
8	S	S-FD	Southbound Ashland Ave Departure		1,327	664	7.0	0	12	6.718							2		
9	S	S-LQ	Left Turn to EB Cermak Rd	SBL	67	67	0.0	0	3		130	73	2	20.048	1,463	1,463	1	54	3
10	S	S-RQ	Right Turn to WB Cermak Rd□SB Blue I	SBR	214	214	0.0	0	3		130	73	2	20.048	1,211	1,211	1	54	3
11	W	W-FA	Westbound Cemak Rd Approach		641	321	7.9	0	12	6.342							2		
12	W	W-TQ	Westbound Cermak Rd Queue	WBT	385	193	0.0	0	6		130	88	2	20.052	3,051	1,526	2	39	3
13	W	W-FD	Westbound Cemak Rd Departure		473	237	7.9	0	12	6.342							2		
14	W	W-LQ	Left Turn to SB Ashland□SB Blue Is Ave	WBL	256	256	0.0	0	3		130	114	2	20.052	1,442	1,442	1	13	3
15	E	E-FA	Eastbound Cermak Rd Approach		405	203	5.6	0	12	7.564							2		
16	E	E-TQ	Eastbound Cermak Rd Queue	EBT	324	162	0.0	0	6		130	104	2	20.052	3,062	1,531	2	23	3
17	E	E-FD	Eastbound Cermak Rd Departure		567	284	5.6	0	12	7.564							2		
18	E	E-LQ	Left Turn to NB Ashland Ave	EBL	81	81	0.0	0	3		130	104	2	20.052	1,596	1,596	1	23	3
19	N	NE-FA	Northbound Blue Island Ave Approach		322	322	5.7	0	9	7.489							1		
20	N	NE-LQ	Left Turn to WB Cemak Rd□NB Ashland	NEL	106	106	0.0	0	3		130	106	2	20.052	1,637	1,637	1	21	3
21	N	NE-RQ	Right Turn to SB Ashland Ave□EB Cemak	NER	216	216	0.0	0	3		130	106	2	20.052	1,425	1,425	1	21	3
22	N	SW-FD	Southbound Blue Island Ave Departure		357	357	5.7	0	9	7.489							1		

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Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width 3 m
Signal Type Actuated
Arrival Type Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
Build - Intersection 1109 Ashland Ave. & W Cermak Rd. - AM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		778	778	2	0	9	18.121							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	778	778	0	0	3		130	58	2	20.020	849	849	1	69	3
3	N	N-FD	Northbound Ashland Ave Departure		1,154	1,154	2	0	9	18.121							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		130	58	2	18.569	849	849	1	69	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		613	613	9	0	9	6.114							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	613	613	0	0	3		130	57	2	20.020	1,291	1,291	1	70	3
9	S	S-FD	Southbound Ashland Ave Departure		660	660	9	0	9	6.114							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		130	57	2	18.569	1,291	1,291	1	70	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	W	W-FA	Westbound Cemak Rd Approach		852	426	4	0	12	8.782							2		
14	W	W-TQ	Westbound Cermak Rd Queue	WBT	668	334	0	0	6		130	92	2	20.021	2,561	1,281	2	35	3
15	W	W-FD	Westbound Cemak Rd Departure		521	261	4	0	12	8.782							2		
16	W	W-LQ	Left Turn to SB Ashland□SB Blue Is Ave	WBL	184	184	0	0	3		130	122	2	20.021	1,347	1,347	1	5	3
17	E	E-FA	Eastbound Cermak Rd Approach		457	229	6	0	12	7.063							2		
18	E	E-TQ	Eastbound Cermak Rd Queue	EBT	380	190	0	0	6		130	100	2	20.021	2,965	1,483	2	27	3
19	E	E-FD	Eastbound Cermak Rd Departure		614	307	6	0	12	7.063							2		
20	E	E-LQ	Left Turn to NB Ashland Ave	EBL	77	77	0	0	3		130	100	2	20.021	1,451	1,451	1	27	3
21	NE	NE-FA	Northbound Blue Island Ave Approach		449	449	2	0	9	21.745							1		
22	NE	NE-LQ	Left Turn to WB Cemak Rd□NB Ashland /	NEL	208	208	0	0	3		130	113	2	20.021	1,401	1,401	1	14	3
23	NE	NE-RQ	Right Turn to SB Ashland Ave□EB Cemal	NER	241	241	0	0	3		130	113	2	20.021	1,329	1,329	1	14	3
24	SW	SW-FD	Southbound Blue Island Ave Departure		200	200	2	0	9	21.745							1		

Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width 3 m
Signal Type Actuated
Arrival Type Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

CTA Ashland Ave BRT
Build - Intersection 1109 Ashland Ave. & W Cermak Rd. - PM Peak

											Queue Traffic Data								
Link ID	Direction	ID	Description	Synchro Link	Total Volume	Volume per Lane	Speed mph	Link Height m	Mixing Zone Width m	Freeflow Emission Factor g/v-mi	Average signal cycle length s	Average red time length s	Clearance lost time s	Idle Emission Factor g/v-hr	Total Sat. Flow v/hr	Saturation Flow Rate v/hr/lane	# Lanes	Green time length s	Yellow time length s
1	N	N-FA	Northbound Ashland Ave Approach		760	760	2	0	9	16.401							1		
2	N	N-TQ	Northbound Ashland Ave Queue	NBT	760	760	0	0	3		110	49	2	20.000	875	875	1	58	3
3	N	N-FD	Northbound Ashland Ave Departure		909	909	2	0	9	16.401							1		
4	N	N-FA-BUS	Northbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
5	N	N-TQ-BUS	Northbound Ashland Bus Queue		12	12	0	0	3		110	49	2	18.569	875	875	1	58	3
6	N	N-FD-BUS	Northbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
7	S	S-FA	Southbound Ashland Ave Approach		659	659	9	0	9	6.031							1		
8	S	S-TQ	Southbound Ashland Ave Queue	SBT	659	659	0	0	3		110	48	2	20.000	1,394	1,394	1	59	3
9	S	S-FD	Southbound Ashland Ave Departure		770	770	9	0	9	6.031							1		
10	S	S-FA-BUS	Southbound Ashland Bus Approach		12	12	16	0	9	2.116							1		
11	S	S-TQ-BUS	Southbound Ashland Bus Queue		12	12	0	0	3		110	48	2	18.569	1,394	1,394	1	59	3
12	S	S-FD-BUS	Southbound Ashland Bus Departure		12	12	16	0	9	2.116							1		
13	W	W-FA	Westbound Cemak Rd Approach		756	378	8	0	12	6.335							2		
14	W	W-TQ	Westbound Cermak Rd Queue	WBT	500	250	0	0	6		110	75	2	20.001	3,041	1,521	2	32	3
15	W	W-FD	Westbound Cemak Rd Departure		490	245	8	0	12	6.335							2		
16	W	W-LQ	Left Turn to SB Ashland□SB Blue Is Ave	WBL	256	256	0	0	3		110	101	2	20.001	1,451	1,451	1	6	3
17	E	E-FA	Eastbound Cermak Rd Approach		486	243	7	0	12	7.022							2		
18	E	E-TQ	Eastbound Cermak Rd Queue	EBT	405	203	0	0	6		110	84	2	20.001	3,006	1,503	2	23	3
19	E	E-FD	Eastbound Cermak Rd Departure		551	276	7	0	12	7.022							2		
20	E	E-LQ	Left Turn to NB Ashland Ave	EBL	81	81	0	0	3		110	84	2	20.001	1,596	1,596	1	23	3
21	NE	NE-FA	Northbound Blue Island Ave Approach		307	307	5	0	9	7.952							1		
22	NE	NE-LQ	Left Turn to WB Cemak Rd□NB Ashland A	NEL	101	101	0	0	3		110	99	2	20.001	1,637	1,637	1	8	3
23	NE	NE-RQ	Right Turn to SB Ashland Ave□EB Cemak	NER	206	206	0	0	3		110	99	2	20.001	1,424	1,424	1	8	3
24	SW	SW-FD	Southbound Blue Island Ave Departure		248	248	5	0	9	7.952							1		

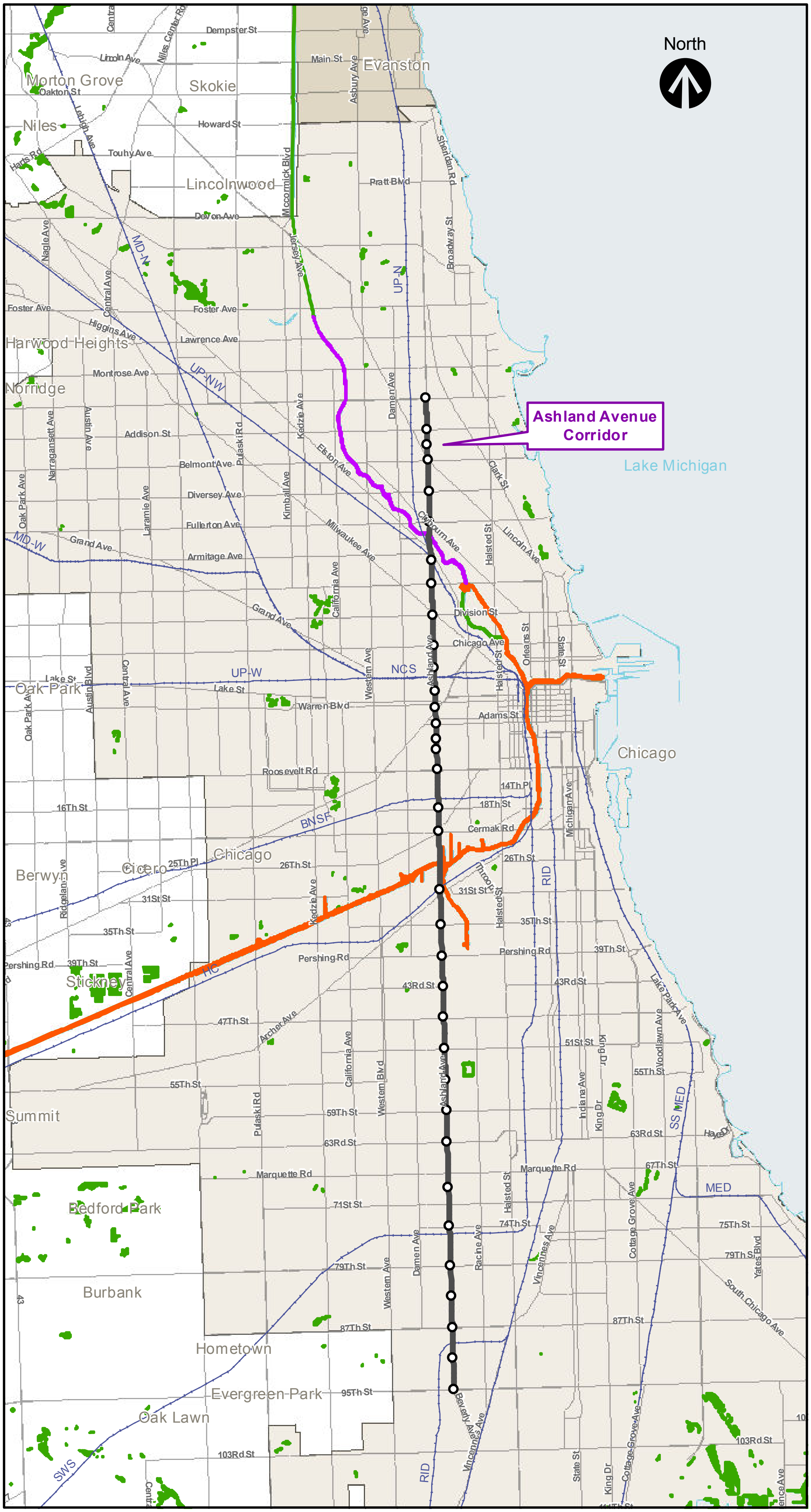
Data in black obtained from traffic reports
Data in blue are calculated values

Mixing zone width for freeflow traffice □road width □6 meters
Mixing zone width for queue traffice □road width

Lane width 3 m
Signal Type Actuated
Arrival Type Average

Direction Legend
N □Northbound
S □Southbound
W □Westbound
E □Eastbound

Appendix E-6: Wetlands Mapping and EcoCat Results



Inset

Legend

Wetlands

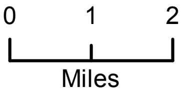
🟧 Chicago Sanitary and Ship Canal

🟪 North Branch Chicago River

🟩 Other NWI Wetlands

Data source:
Cook County Assessor, City of Chicago,
CMAP, US Census, National Wetland Inventory (NWI)

Scale



Irving Park Road to
Roscoe Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311469
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

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The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
40N, 14E, 17
40N, 14E, 18
40N, 14E, 19
40N, 14E, 20

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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EcoCAT
Ecological Compliance Assessment Tool

Roscoe Street to
Diversey Parkway

Applicant:	CDM Smith	*IDNR Project Number:*	1311522
Contact:	Abby Mazza	*Date:*	03/25/2013

Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

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The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
40N, 14E, 19
40N, 14E, 20
40N, 14E, 29
40N, 14E, 30

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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EcoCAT
Ecological Compliance Assessment Tool

Diversey Parkway
to McLean Avenue

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311523
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

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Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
40N, 14E, 29
40N, 14E, 30
40N, 14E, 31
40N, 14E, 32

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

Disclaimer

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EcoCAT
Ecological Compliance Assessment Tool

McLean Avenue to
Blackhawk Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311524
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

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Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
39N, 14E, 5
39N, 14E, 6
40N, 14E, 31
40N, 14E, 32

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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EcoCAT
Ecological Compliance Assessment Tool

Blackhawk Street to
Chicago Avenue

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311525
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
39N, 14E, 5
39N, 14E, 6
39N, 14E, 7
39N, 14E, 8

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

Disclaimer

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EcoCAT
Ecological Compliance Assessment Tool

Chicago Avenue to
Lake Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311526
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Peregrine Falcon *(Falco peregrinus)*

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
39N, 14E, 5
39N, 14E, 6
39N, 14E, 7
39N, 14E, 8

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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EcoCAT
Ecological Compliance Assessment Tool

Lake Street to Polk Street

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311527
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Peregrine Falcon *(Falco peregrinus)*
Peregrine Falcon *(Falco peregrinus)*

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
39N, 14E, 7
39N, 14E, 8
39N, 14E, 17
39N, 14E, 18

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

Disclaimer

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Privacy

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Polk Street to 18th Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311529
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Peregrine Falcon *(Falco peregrinus)*
Peregrine Falcon *(Falco peregrinus)*
Peregrine Falcon *(Falco peregrinus)*

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
39N, 14E, 18
39N, 14E, 19
39N, 14E, 20

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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EcoCAT
Ecological Compliance Assessment Tool

18th Street to 31st Street

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311531
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Peregrine Falcon *(Falco peregrinus)*

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
39N, 14E, 19
39N, 14E, 20
39N, 14E, 29
39N, 14E, 30
39N, 14E, 31
39N, 14E, 32

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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EcoCAT
Ecological Compliance Assessment Tool

31st Street to 38th Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311532
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Peregrine Falcon *(Falco peregrinus)*

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
39N, 14E, 29
39N, 14E, 30
39N, 14E, 31
39N, 14E, 32

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

Disclaimer

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EcoCAT
Ecological Compliance Assessment Tool

38th Street to 45th Street

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant:	CDM Smith	*IDNR Project Number:*	1311533
Contact:	Abby Mazza	*Date:*	03/25/2013

Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street,, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
38N, 14E, 5
38N, 14E, 6
39N, 14E, 31
39N, 14E, 32

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

Disclaimer

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EcoCAT
Ecological Compliance Assessment Tool

45th Street to
Garfield Blvd

Applicant:	CDM Smith	*IDNR Project Number:*	1311534
Contact:	Abby Mazza	*Date:*	03/25/2013
Address:	125 S Wacker Drive Suite 600 Chicago, IL 60606		

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
38N, 14E, 5
38N, 14E, 6
38N, 14E, 7
38N, 14E, 8
38N, 14E, 17
38N, 14E, 18

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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Garfield Blvd to
69th Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311535
Date: 03/25/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

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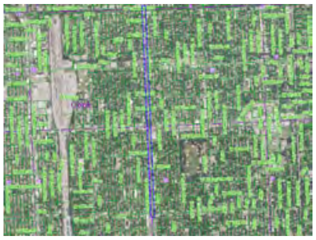
The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.



County: Cook

Township, Range, Section:
38N, 14E, 7
38N, 14E, 8
38N, 14E, 17
38N, 14E, 18
38N, 14E, 19
38N, 14E, 20

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

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69th Street to 74th Street

Applicant:	CDM Smith	*IDNR Project Number:*	1311536
Contact:	Abby Mazza	*Date:*	03/25/2013
Address:	125 S Wacker Drive Suite 600 Chicago, IL 60606		

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

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The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
38N, 14E, 19
38N, 14E, 20
38N, 14E, 29
38N, 14E, 30

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

Disclaimer

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74th Street to 79th Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311589
Date: 03/26/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
38N, 14E, 29
38N, 14E, 30
38N, 14E, 32

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Other

Disclaimer

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EcoCAT
Ecological Compliance Assessment Tool

79th Street to 91st Street

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311591
Date: 03/26/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

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Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
37N, 14E, 5
37N, 14E, 6
38N, 14E, 29
38N, 14E, 30
38N, 14E, 31
38N, 14E, 32

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Impact Assessment Section
217-785-5500
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91st Street to 95th Street

Applicant: CDM Smith
Contact: Abby Mazza
Address: 125 S. Wacker Drive
Suite 600
Chicago, IL 60606

IDNR Project Number: 1311594
Date: 03/26/2013

Project: Western and Ashland Corridors Bus Rapid Transit (BRT)
Address: Ashland Avenue from 500 feet north of Irving Park Road to 500 ft. south of 95th Street, Chicago

Description: The proposed improvements generally include construction of BRT stations and boarding areas, upgrade of traffic signal systems, implementation of queue jump lanes and turn restrictions at intersections, removal of travel lanes to accommodate a designated bus lane in each direction, pavement milling and resurfacing, and streetscape improvements. This submittal is for the Ashland Corridor, which extends from Irving Park Road on the north to 95th Street on the south. The Western Corridor will be evaluated separately as part of a future submittal.

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Township, Range, Section:
37N, 14E, 5
37N, 14E, 6
37N, 14E, 7
37N, 14E, 8

IL Department of Natural Resources Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
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Appendix E-7: Hazardous Materials Technical Memorandum

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *August 8, 2013*

Subject: *Hazardous Materials*

Prepared by: CDM Smith, Inc.

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and the Federal Transit Authority (FTA), is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue Bus Rapid Transit (BRT) Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

- Construction of 35 median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

Purpose

This memorandum analyzes the potential impacts of the Ashland Avenue BRT Project with respect to hazardous materials. Potential sources of hazardous materials impacts, both within and adjacent to the Ashland Avenue BRT Project were identified. For the purpose of this analysis, a hazardous material is any media such as soil, groundwater, or building materials that contain detectable concentrations of any state or federally regulated contaminant.

Methodology and Results

The historical and present uses of areas within the project corridor were evaluated for potential sources of hazardous material impacts. This included a search of local, state, and federal regulatory databases was conducted by Environmental Data Resources, Inc. (EDR) to identify sites that currently or have historically handled, stored, transported, released, or disposed of hazardous or regulated waste as these types of sites are potential sources of hazardous material contamination. Contamination can occur from a source located directly within the project footprint or from an off-site source where contamination that has migrated to within the project footprint.

Search distances were either 0.1 or 0.25 mile from Ashland Avenue, as summarized in **Table 1** in **Attachment A.** The search distance was based on the nature of the sites included in the database and the separation distance at which impacts become unlikely. **Table 1** also summarizes the number of sites identified by database type. **Attachment B** provides figures depicting the locations of the identified sites relative to the Ashland Avenue BRT Project. A complete list of each individual site identified by EDR is provided in **Table 2** in **Attachment A.**

No National Priority List (NPL), Federal Engineering or Institutional Control, or State Brownfield sites were identified with thin the search distance. The most common type of site identified included Underground Storage Tank (UST), Leaking Underground Storage Tank (LUST), and Resource Conservation and Recovery Act Small Quantity Generator (RCRA-SQG) sites. These types of sites are present along the majority of the project corridor and are typical of urban areas.

Sites of the greatest concern include Comprehensive Environmental Response, Compensation and Liability Information System Sites (CERCLIS), CERCLIS No Further Remediation Planned (CERCLIS-NFRAP), State Site Unit Listings (SSU), Solid Waste Disposal or Landfill sites (SWF/LF), Illinois Planning Commission Active and Inactive Solid Waste Disposal Site Inventory (IL NIPC) sites, and RCRA-Large Quantity Generator sites (RCRA-LQG) adjacent to the Ashland Avenue BRT Project (see **Table 3** in **Attachment A**). These types of sites have a higher potential for wide-spread contamination based on the type and nature of activities that resulted in their listings.

In addition to regulated sites and given the urban setting of the project area, the potential exists for the presence of typical urban fill throughout the entire project area. Typical urban fill materials contain elevated concentrations of polynuclear aromatic hydrocarbons and metals due to nearby roadways, railways, and industrial and commercial lands uses and activities. Industrial and commercial land uses and activities include coal yards, gas stations, auto repair shops, machine shops, manufacturing plants, dry cleaners, USTs, substations, and transformers. This type of contamination is not necessarily associated with a release from a specific site or source. In addition, urban fill may include contaminated building demolition debris, which was commonly used as fill material in excavations, to increase elevations at sites during development.

Environmental Impacts

No-Build Alternative

Under the No-Build Alternative, the project would not be constructed and no impacts to hazardous materials would occur.

Ashland Avenue BRT Project

Although the project footprint is limited to within the existing right-of-way and no property acquisition is expected, soil and/or groundwater within the right-of-way during could be contaminated with hazardous materials from urban fill and/or adjacent or nearby regulated hazardous material sites identified in the database search.

Construction of the Ashland Avenue BRT Project would include subsurface ground disturbance activities, which could result in contaminated soil and/or groundwater being encountered. Subsurface ground disturbance activities would include excavation to between three and five feet below ground surface (bgs) in order to construct the slab-on-grade platforms and shelters at the proposed BRT stations and the landscaped medians between stations. In addition, although it is not expected or required, if desired by the utility owner, existing utilities may be relocated at the time of construction, which would require limited subsurface excavation to approximately the same depth bgs.

Because landscaped medians are proposed and utilities are present along the majority of the project, excavation could occur along the entire project length; however, it is expected that the majority of excavation would occur at the proposed BRT stations during installation of the platforms and shelters. **Table 4** in **Attachment A** summarizes the number and type of sites identified within 0.1 to 0.25 miles of each proposed BRT station, where the majority of subsurface excavation is expected to occur.

Impacts

Procedures for identifying, characterizing, managing, handling, storing, and disposing of contaminated soil and groundwater encountered during construction activities would be developed prior to construction. These procedures would cover the entire project area, as it is assumed that all material has at least some level of contamination associated with it. Contaminated material generated during construction would be disposed of at a facility permitted to accept such material.

In addition health and safety plans for construction activities would be developed by the contractors and read and signed by all workers prior to starting any work. The health and safety would identify potential contaminants of concern, required personal protection equipment and procedures, and emergency response procedures.

Right-of-way acquisition is not anticipated for the Ashland Avenue BRT Project; however, if it was to occur, there is a substantial potential liability associated with ownership and acquisition of

Attachment A

Tables

Table 1: Database Search Distance and Number of Sites Identified

	Database Name	Search Distance from Project Limits (miles)	Number of Sites within Search Distance
Federal Databases	National Priority List Sites (NPL)	0.25	0
	Delisted NPL Sites	0.25	0
	Comprehensive Environmental Response, Compensation and Liability Information System Sites (CERCLIS)	0.25	3
	CERCLIS-No Further Remediation Planned Sites (CERCLIS-NFRAP)	0.25	16
	Resource Conservation and Recovery Act Corrective Action Sites (RCRA CORRACTS)	0.25	8
	RCRA Treatment, Storage, and Disposal Sites (RCRA-TSDF)	0.25	2
	RCRA Large Quantity Hazardous Waste Generators (RCRA-LQG)	0.25	7
	RCRA Small Quantity Hazardous Waste Generators (RCRA-SQG)	0.10	103
	RCRA Conditionally Exempt Hazardous Waste Generators (RCRA-CESQ)	0.10	40
	Engineering Controls Sites (US ENG CONTORLS)	0.10	0
	Institutional Control Sites (US INST CONTROL)	0.10	0
	Brownfield Sites (US BROWNFIEDS)	0.25	1
	Emergency Response Notification System (ERNS)	0.10	17
State Databases	Illinois State Sites Unit Listing (SSU)	0.25	1
	Site Remediation Program (SRP)	0.25	81
	Engineered Barrier Site (ENG CONTROLS)	0.10	27
	Institutional Control Site (INST CONTROLS)	0.10	26
	Leaking Underground Storage Tank Sites (LUST)	0.10	122
	Underground Storage Tank Sites (USTs)	0.10	212
	Former Manufactured Gas Plant Sites (MGP)	0.25	1
	Brownfield Sites	0.25	0
	Landfill or Solid Waste Disposal Sites (SWF/LF)	0.25	3
	Northeastern Illinois Planning Commission Active and Inactive Solid Waste Disposal Site Inventory (IL NIPC)	0.25	1
	Spill Incident List (SPILLS)	0.10	157
	Drycleaners License List (IL DRYCLEANERS)	0.10	0

Table 2: Summary of Identified Regulated Sites

EDR Map ID	Figure 1 ID	Name*	Address*	Database**
1	1	Erwin Screw And Bolt Company	4036-4048 North Hermitage Avenue, Chicago, IL, 60613	SRP, INST CONTROL, ENG CONTROL
2	2a	Lake View High School	4015 N Ashland Ave, Chicago, IL, 60613	RCRA-SQG
	2b	Amoco Ss 5044 Fac 10562	Ashland & Irving Park, Chicago, IL, 60613	UST
3	3	New Plus One Cleaners	1415 West Irving Park, Chicago, IL, 60613	SRP, INST CONTROL, DRYCLEANERS
4	4	Grace Auto Sales	3800 N Ashland Ave, Chicago, IL, 60613	RCRA-SQG, LUST
		---	3800 N Ashland Ave, Chicago, IL	SPILLS
		Grace Auto Sales	3800 N Ashland Ave, Chicago, IL, 60613	UST
5	5a	Amoco 5064	3600 N Ashland And Addison, Chicago, IL, 60613	RCRA-SQG
		---	3600 N Ashland Ave, Chicago, IL	SPILLS
		Ashland Addison Citgo	3600 N. Ashland, Chicago, IL, 60613	UST
		Bp Products North America	3600 North Ashland Avenue, Chicago, IL, 60613	LUST
	5b	Midalgo Auto Rpr	3636 N Ashland, Chicago, IL, 60613	RCRA-SQG
	5c	Peg Allison	3654 N Bosworth, Chicago, IL, 60613	UST
	5d	Warshawsky Dr Neil	3655-59 No Ashland, Chicago, IL, 60613	UST
	5e	Former Oklahoma 7010	3656 N Ashland, Chicago, IL, 60613	UST
		Speedway Superamerica Service Station #7010	3656 North Ashland, Chicago, IL, 60613	LUST
	5f	Coverall Laundry Service Inc	3715 N Ashland Ave, Chicago, IL, 60613	RCRA-CESQG, LUST
		Coverall Laundry Ser Inc	3715 N Ashland Ave, Chicago, IL, 60613	UST
		---	3715 North Ashland, Chicago, IL	ERNS
	5g	Chicago Auto Body Shop	3717 N Ashland Ave, Chicago, IL, 60613	RCRA-CESQG
	5h	Macs Trailer Rental Inc	3749 N Ashland, Chicago, IL, 60613	UST
		---	3749 N Ashland Ave, Chicago, IL	SPILLS
		Millenium Int'L	3749 North Ashland Ave., Chicago, IL, 60613	LUST
6	6a	Weinman Bert Ford	3501 N Ashland Ave, Chicago, IL, 60657	RCRA-SQG
	6b	---	3552 N Ashland, Chicago, IL	SPILLS
		Shell Service Sta	3552 N. Ashland, Chicago, IL, 60657	RCRA-SQG
		Shell Station #136947	3552 N. Ashland, Chicago, IL, 60657	UST
		Shell Oil Products Us	3552 North Ashland, Chicago, IL, 60657	LUST, SRP, INST CONTROL, ENG CONTROL
	6c	Bert Weinman Ford	3535 N Ashland, Chicago, IL, 60657	UST
7	7	Lake Shore Mazda In	3434 N Ashland Ave, Chicago, IL, 60657	RCRA-SQG
	7	---	3434 N Ashland Ave, Chicago, IL,	SPILLS
	7	Lake Shore Mazda	3434 North Ashland Ave., Chicago, IL, 60657	LUST, UST
8	8a	Commercial Apartment Building	1608 W. Belmont, Chicago, IL, 60657	UST
		---	1608 West Belmonte Ave, Chicago, IL	SPILLS
	8b	Commercial Office Building	1620 Belmont, Chicago, IL, 60610	UST
	8c	Belmont Bowl	1635-1649 W Belmont, Chicago, IL, 60610	RCRA-CESQG
	8d	Walgreens #4944	1649 W Belmont, Chicago, IL, 60657	RCRA-SQG
	8e	Lasalle Bank Lake View	3201 N Ashland Ave, Chicago, IL, 60657	UST
	8f	Former Citizens Bank	3226 N. Lincoln, Chicago, IL, 60657	UST
	8g	Rhee Duk Hee	3235 N Ashland, Chicago, IL, 60657	UST
	8h	Lincoln Ashland & Belmont Llc	3240 N Ashland, Chicago, IL, 60657	RCRA-SQG
		Lincoln Ashland & Belmont Llc	3240 N Ashland, Chicago, IL, 60657	UST
	8i	---	3262 N Lincoln Ave, Chicago, IL	SPILLS
	8j	Whole Foods Market	3300 N Ashland, Chicago, IL, 60657	RCRA-SQG
	8k	Commercial Building	3330 N. Ashland, Chicago, IL, 60657	UST
	8l	Northstar Finance Inc.	3332-3334 North Ashland, Chicago, IL, 60657	LUST
		---	3332-34 N Ashland, Chicago, IL	SPILLS
		Vacant Bldg	3332-34 N Ashland Ave, Chicago, IL, 60657	UST
	8m	Ymca Of Metropolitan Chicago	3333 N Marshfield, Chicago, IL, 60657	UST
		---	3336 N Ashland Ave, Chicago, IL	SPILLS
		Osvaldo Dr Mena	3336 N Ashland Ave, Chicago, IL, 60657	UST
		Mena, Dr. Osvaldo	3336 North Ashland Ave., Chicago, IL, 60657	LUST
	8n	Marshall J Moltz	3344 North Ashland, Chicago, IL, 60657	UST
9	9	Construction Site	1555 W School St, Chicago, IL, 60657	UST
10	10a	Painless Piercing	3144 N Lincoln Ave, Chicago, IL, 60657	UST
		Jensen, Shirley	3144 North Lincoln, Chicago, IL, 60657	LUST
	10b	3160 N Lincoln Ave, Suite 212	3160 N Lincoln Ave, Suite 212, Chicago, IL, 60657	UST
11	11a	One Hour Cleaners	3039 N Ashland Ave, Chicago, IL, 60657	RCRA-SQG
	11b	Burley	1630 W Barry, Chicago, IL, 60657	RCRA-SQG
	11c	Image Dry Cleaners	3103 North Ashland, Chicago, IL, 60657	DRYCLEANERS
	11d	Goldmark Plaza Two Inc	3055 N Ashland Ave, Chicago, IL, 60657	UST
	11e	Debt Free, Inc.	3040 N. Ashland Avenue, Chicago, IL, 60657	UST
12	12	Appleton Electric Co	1701 W Wellington, Chicago, IL, 60657	LUST, SRP
13	13a	Jewel Osco 3441	2940 N Ashland Ave, Chicago, IL, 60657	RCRA-CESQG
	13b	Cd One Price Cleaners #32	2955 N Ashland Avenue 1St Flr, Chicago, IL, 60657	DRYCLEANERS
		Cd One Price Cleaners	2955 North Ashland Avenue, Chicago, IL, 60657-	SRP, ENG CONTROL
14	14	Joy Cleaner Ii	2904 N Ashland, Chicago, IL, 60657	RCRA-SQG
		Joy Cleaner Ii	2904 North Ashland Avenue, Chicago, IL, 60657-	SRP

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EDR Map ID	Figure 1 ID	Name*	Address*	Database**
15	15a	2730 North Ashland Llc	2724-2730 North Ashland Avenue, Chicago, IL, 60614-	SRP
		---	2730 N Ashland, Chicago, IL	SPILLS
		2730 N Ashland Llc	2730 N Ashland Ave, Chicago, IL, 60614	RCRA-SQG
		Vacant	2730 N. Ashland, Chicago, IL, 60614	UST
		2730 North Ashland Llc	2730 North Ashland Avenue, Chicago, IL, 60614	LUST
	15b	Mcduffees Wood Fronts Inc	2750 N Ashland Ave, Chicago, IL, 60614	RCRA-SQG
	15c	Midwest Co Enterprises Inc	2735 N Ashland, Chicago, IL, 60614	UST
		---	2735 N Ashland Ave, Chicago, IL	SPILLS
		Midwestco Enterprises Inc	2735 North Ashland, Chicago, IL, 60614	RCRA-SQG
	15d	---	2800 N Ashland, Chicago, IL	SPILLS
		Construction Site	2800 N. Ashland, Chicago, IL, 60657	UST
	15e	---	2801 N Ashland, Chicago, IL	SPILLS
		Shell Oil Products Us	2801 North Ashland, Chicago, IL, 60657	LUST
		True North Location 1901	2801 North Ashland Ave., Chicago, IL, 60657	UST
	15f	Metals Specialties	2809-2825 North Ashland Avenue, Chicago, IL, 60657	SRP, INST CONTROL, ENG CONTROL
	15g	Chief Display Print	1647 W Wolfram, Chicago, IL, 60657	RCRA-SQG
16	16	1515 West Diversey Llc	1515 West Diversey Parkway, Chicago, IL, 60614-	SRP
17	17a	Columbia Metal Spinning Co Inc	1644 W Wrightwood Ave, Chicago, IL, 60614	CERCLIS-NFRAP
	17b	Prescott William	1632 W Wrightwood Ave, Chicago, IL, 60614	RCRA-SQG
	17c	1011957	1640 W Wrightwood Ave, Chicago, IL, 60614	UST
18	18a	---	Chicago, IL	SPILLS
	18b	Walgreen Store # 1173	1520 W Fullerton, Chicago, IL, 60614	RCRA-SQG
	18c	Matot D A Inc	1533 W Altged St, Chicago, IL, 60614	RCRA-CESQG
		Chicago Homes On Altgeld Llc	1533 W Altgeld, Chicago, IL, 606142094	UST
		---	1533 W Altgeld St, Chicago, IL	SPILLS
		Chicago Homes On Altgeld Llc	1533 West Altgeld St., Chicago, IL, 60614	LUST
	18d	Lube N Oil Exchange	1540 W Fullerton Ave, Chicago, IL, 60614	UST
	18e	Amoco Ss#24038 Fac#10630	1607 W. Fullerton Ave., Chicago, IL, 60614	UST
		Amoco Oil Co. #24038	1607 West Fullerton, Chicago, IL, 60614	LUST
	18f	---	1633 W Medill Av, Chicago, IL	ERNS
		City Of Chicago	1633 W Medill Ave, Chicago, IL, 60614	RCRA-SQG
		City Of Chicago	1633 W Medill Ave, Chicago, IL, 60614	SPILLS
		---	1633 W Medill Ave, Chicago, IL	SPILLS
		Dept Street & Sanitation	1633 W Medill Ave, Chicago, IL, 60614	UST
		Medill Material Recovery & Recycling Facility (Active)	1633 W. Medill Ave., Chicago, IL	SWF/LF
		Chicago, City Of	1633 West Medill Ave., Chicago, IL, 60614	LUST
	18g	Walts Auto Ser Inc	1650 Fullerton Ave, Chicago, IL, 60614	UST
		Walt'S Automotive Service, Inc.	1650 West Fullerton Avenue, Chicago, IL, 60614-	LUST, SRP, ENG CONTROL
	18h	Former Electro Finishers Site	1654-1702 W Fullerton Ave, Chicago, IL, 60614	UST
		Electro-Finishers, Inc.	1654-1702 West Fullerton Avenue, Chicago, IL, 60614-	SRP
		Mangrum Glass And Mirror Ltd	1655 W Fullerton Ave, Chicago, IL, 60614	RCRA-SQG, LUST
		Mangram Glass & Mirror, Ltd.	1655 West Fullerton Avenue, Chicago, IL, 60614	UST
	18i	Electro Coatings Inc	1662 W Fullerton Ave, Chicago, IL, 60614	SSU, SPILLS
		Former Electro Finishers	1662 West Fullerton Avenue, Chicago, IL, 60614	PRP, CERCLIS
	18j	Jiffy Lube	2366 Clybourn, Chicago, IL, 60614	RCRA-SQG
		Jiffy Lube 592	2366 N Clybourn Ave, Chicago, IL, 60614	UST
	18k	---	2400 N. Ashland Ave. Fullerton & Ashland, Chicago, IL,	ERNS
	18l	Abandoned Warehouse	2411 N. Marshfield, Chicago, IL, 60614	UST
	18m	---	2415 N Ashland Ave, Chicago, IL	SPILLS
		Ciucci Regina	2415 N. Ashland, Chicago, IL, 60614	UST
		Ciucci, Regina	2415 North Ashland Ave., Chicago, IL, 60614	LUST
	18n	Time Tek	2443 North Clybourn Ave., Chicago, IL, 60614	LUST, SRP
	18o	Chicago, City Of	2450 N Ashland, Chicago, IL, 60614	RCRA-SQG
	18p	Serlin Iron And Metal	2501 North Bosworth Avenue, Chicago, IL, 60614-	SRP
	18q	Netzels Auto Repair Inc	2522 N Ashland Ave, Chicago, IL, 60614	LUST
		Netzel Auto Repair Inc	2522 N Ashland Ave, Chicago, IL, 60614	UST
	18r	Bucaro Brothers Auto Care	2526 N Ashland Ave, Chicago, IL, 60614	RCRA-SQG
	18s	---	2545 N Ashland Ave, Chicago, IL	SPILLS
		Dept Streets & Sanitation	2545 N Ashland Ave, Chicago, IL, 60614	UST
		Chicago Department Of Environment	2545 North Ashland Avenue, Chicago, IL, 60614-	LUST, SRP, INST CONTROL, ENG CONTROL
19	19a	Chemical Systems	1735 West Fullerton Avenue, Chicago, IL, 60614-	LUST, SRP, ENG CONTROL
	19b	Oriental Cleaners	1730 West Fullerton Avenue, Chicago, IL, 60614-	SRP
	19c	Former Amoco Facility	1801 West Fullerton Avenue, Chicago, IL, 60614-	SRP
20	20a	---	2283 N Clybourn, Chicago, IL	ERNS
	20b	---	Chicago, IL	SPILLS
	20c	Market Natl Bank Tr 8518	2329 N Bosworth, Chicago, IL, 60614	UST
	20d	Market Natl Bank Tr 8518	2321 N Bosworth, Chicago, IL, 60614	UST
21	21a	2222 Elston Llc	2212 North Elston Avenue, Chicago, IL, 60614-	LUST, SRP, ENG CONTROL
	21b	Baker Development	2228 North Elston Avenue, Chicago, IL, 60614-	SRP
	21c	Baker Development Corporation	2180-2196 North Elston Avenue, Chicago, IL, 60614-	SRP, ENG CONTROL

Table 2: Summary of Identified Regulated Sites

EDR Map ID	Figure 1 ID	Name*	Address*	Database**
22	22a	West Webster Llc	1500 West Webster Avenue, Chicago, IL, 60614-	LUST, SRP, INST CONTROL, ENG CONTROL
	22b	Gutmann & Company	1511 West Webster Avenue, Chicago, IL, 60614-	SRP, INST CONTROL
23	23a	Hayes Boiler & Mechanical	2160 N Ashland, Chicago, IL, 60614	UST
		Hayes Mechanical	2160 N Ashland Ave, Chicago, IL, 60614	RCRA-SQG
	23b	Chicago Dept Of Trans	1600 W Webster, Chicago, IL, 60614	RCRA-SQG
	23c	---	Ashland & Webster, Chicago, IL	SPILLS
	23d	---	Chicago, IL	SPILLS
	23c	---	Ashland & Webster, Chicago, IL	SPILLS
24	24a	Hdy Incorporated	2020 N Ashland, Chicago, IL, 60614	UST
		Hdy	2020 N Ashland Ave, Chicago, IL, 60614	RCRA-SQG
		World Equities	2020 North Ashland, Chicago, IL, 60614	LUST
	24b	Reichhold Chemicals Inc	2120 N Elston Ave, Chicago, IL, 606143904	CERCLIS-NFRAP
		Reichhold Chemicals	2120 North Elston Avenue, Chicago, IL, 60614-	LUST, SRP, INST CONTROL, ENG CONTROL, UST
	24c	Florence Corporation	2101 North Elston Avenue, Chicago, IL, 60614-	SRP, INST CONTROL
	24d	Reichold Chemicals	2100 N Elston Ave, Chicago, IL, 60614	CORRACTS
		Polychrome Chemical Corporation	2100 North Elston Avenue, Chicago, IL, 60614	SRP, INST CONTROL, ENG CONTROL
	24e	Stereotype Equipment Co	2062 Elston Ave, Chicago, IL, 60614	UST
		Baker Development Corporation	2062 North Elston Avenue, Chicago, IL, 60614	LUST, SRP, INST CONTROL
	24f	Hayes Mechanical	2040-2160 North Ashland Avenue, Chicago, IL, 60614	SRP
25	25a	Cometco Corporation	1509 West Cortland Street, Chicago, IL, 60622	LUST, SRP
	25b	Roach Brothers Llc	1529 West Armitage Avenue, Chicago, IL, 60622	SRP
	25c	Fort Dearborn Mfg	1574 Homer Street, Chicago, IL, 60622	CERCLIS-NFRAP
	25d	---	1600 W Armitage Ave, Chicago, IL	SPILLS
	25e	Mark Iv Rlty Group Inc/Exoho Ass	1824 N Besly Ct, Chicago, IL, 60622	UST
		Exoho Assoc. Ltd. Partnership	1824 North Besly, Chicago, IL, 60622	LUST
	25f	Aero Plating Works	1860 N Elston, Chicago, IL, 60622	CORRACTS, RCRA-TSDF
	25g	---	1901 N Elston, Chicago, IL	SPILLS
		---	1901 N. Elston, Chicago, IL	SPILLS
		Star Cw, Inc., D/B/A Star Car Wash	1901 N. Elston, Chicago, IL, 60622	UST
		Star Car Wash/Mobil	1901 North Elston Avenue, Chicago, IL, 60622	LUST
	25h	Martinucci Family Enterprises, L.P.	1940 North Elston Avenue, Chicago, IL, 60622	SRP, INST CONTROL, ENG CONTROL
	25i	Jordyn Michael, Llc	1961-1969 North Elston Avenue, Chicago, IL, 60622	SRP, INST CONTROL, ENG CONTROL
	25j	Chicago Lock Stock & Storage	2001 N Elston, Chicago, IL, 60614	UST
		---	2001 N Elston Ave, Chicago, IL	SPILLS
	25k	Ozinga Plant #32	2001 N Mendell St, Chicago, IL, 60614	UST
	25l	Ctre, Inc.	2001 North Elston Avenue, Chicago, IL, 60614	LUST, SRP
	25m	Horween Leather Co	2015 N Elston Ave, Chicago, IL, 60614	SPILLS
	25n	Griffin Plating Co Inc	2020 N Holly St, Chicago, IL, 60614	RCRA-SQG, CERCLIS-NFRAP
	25o	Comed	N Besly Ct & W Cortland St, Chicago, IL, 60622	RCRA-SQG
26	26	Orloff Jaguar	1924 North Paulina Street, Chicago, IL, 60622	LUST, SRP
27	27	Lipin Enterprises Inc	1800 N Ashland Ave, Chicago, IL, 60622	RCRA-CESQG
		Chicago Park District	1800 N Ashland Ave, Chicago, IL, 60622	UST
		Chicago Park District	1800 North Ashland Avenue, Chicago, IL, 60622	SRP
28	28a	---	1525 W North Ave, Chicago, IL	SPILLS
		---	1525 W North Ave, Chicago, IL	SPILLS
		---	1525 W North Ave, Chicago, IL	SPILLS
		Equilon Enterprises	1525 West North Ave., Chicago, IL, 60622	LUST
	28b	---	1533 W North Ave, Chicago, IL	SPILLS
		Scribcor Inc.	1533 West North Ave., Chicago, IL, 60622	LUST
	28c	Amoco	1551 W North Ave, Chicago, IL, 60622	RCRA-SQG
		---	1551 W North Ave, Chicago, IL	SPILLS
		Shell	1551 W. North Ave., Chicago, IL, 60622	UST
		Bp Products North America, Inc.	1551 West North Ave., Chicago, IL, 60622	LUST
		---	1551 West North Avenue, Chicago, IL	SPILLS
	28d	Burr	1621 W Wabansia, Chicago, IL, 60622	RCRA-SQG
	28e	Woodnorth, Harry	1650 N Bosworth, Chicago, IL, 60642	RCRA-SQG
		City Lites	1650 N Bosworth, Chicago, IL, 60622	UST
		---	1650 N Bosworth St, Chicago, IL	SPILLS
		M.C.M. Properties	1650 North Bosworth St., Chicago, IL, 60622	LUST
	28f	Tri Crest Offset Inc	1701 Thru 13 N Ashland, Chicago, IL, 60622	RCRA-SQG
	28g	Pac Lofts	17131735 North Paulina Street, Chicago, IL, 60622	SRP, ENG CONTROL
	28h	Miller Wagnaar Studios	1720 N Marshfield, Chicago, IL, 60622	RCRA-SQG
		Nichols Jay	1720 N Marshfield Ave, Chicago, IL, 60622	RCRA-SQG
	28j	Mediatech Inc	1740 N Marshfield, Chicago, IL, 60622	UST
	28i	Amoco Oil Co. #5091	North & Ashland, Chicago, IL, 60614	LUST
29	29a	Sipi Metals Corp	1720 Elston Avenue, Chicago, IL, 60642	TIER 2, SRP
		Sipi Metals Corp	1720 N Elston, Chicago, IL, 60622	RCRA-LQG
	29b	Elkwood Plating Incorporated	1657 North Elston Avenue, Chicago, IL, 60622	RAATS, CORRACTS, CERCLIS-NFRAP, UST
	29c	D.C. Franche Metal Coatings	1401 Wabansia, Chicago, IL, 60622	CERCLIS-NFRAP
30	30	Body Builders Inc	1634 W North Ave, Chicago, IL, 60622	RCRA-CESQG

Table 2: Summary of Identified Regulated Sites

EDR Map ID	Figure 1 ID	Name*	Address*	Database**
31	31a	---	1533 N Ashland Ave, Chicago, IL	SPILLS
		Auto Repair Shop	1533 N. Ashland, Chicago, IL, 60622	UST
		---	1533 North Ashland Ave, Chicago, IL	SPILLS
		Euro Autoplex	1533 North Ashland Avenue, Chicago, IL, 60622	LUST
	31b	Shell Service Station	1525 West North Bosworth, Chicago, IL, 60622	UST
32	32a	Mikes Furniture Appliance Pu	1259 N Ashland, Chicago, IL, 60622	RCRA-CESQG
	32b	Kmart 4729	1360 Ashland Ave N, Chicago, IL, 60622	RCRA-CESQG
	32c	Centrum Building	1309 North Ashland Avenue, Chicago, IL, 60622	UST
33	33a	Cvs Pharmacy 5394	1200 N Ashland Ave, Chicago, IL, 60622	RCRA-CESQG
	33b	Wanland & Associates	1630-1632 W Division St, Chicago, IL, 60622	UST
		Wanland & Associates, Inc.	1630 West Division Street, Chicago, IL, 60622	SRP, INST CONTROL, ENG CONTROL
	33c	Wicker Park Station	1635 W Division St, Chicago, IL, 60622	UST
	33d	Alko Construction	1624 W. Division, Chicago, IL, 60622	UST
34	34a	Comed	1510 West Division Street, Chicago, IL, 60622-3312	SRP
	34b	---	1170 N Milwaukee Ave, Chicago, IL	SPILLS
35	35a	Northwest Service	1000 N Ashland, Chicago, IL, 60622	RCRA-SQG, LUST
		Northwest Service	1000 N Ashland Ave, Chicago, IL, 60620	UST
	35b	Wells Comm Academy	936 N Ashland Ave, Chicago, IL, 60622	RCRA-CESQG
	35c	New Construction Development	1601-10 W. Augusta Blvd., Chicago, IL, 60622	UST
36	36a	Meyers Department Store	1533-39 W Chicago Ave, Chicago, IL, 60622	UST
	36b	Clothing Store	1552 W Chicago Ave, Chicago, IL, 60622	UST
	36c	---	1600 W Chicago Ave, Chicago, IL	SPILLS
		Vacant Building	1600 W. Chicago Ave., Chicago, IL, 60622	UST
		Pinnacle Development	1600 West Chicago Avenue, Chicago, IL, 60622	LUST
	36d	Former Goldblatts	1613-35 West Chcago Avenue, Chicago, IL, 60622	UST
	36e	The Dollar Store	1618 W Chicago Ave, Chicago, IL, 60622	UST
	36f	Tasemkin Dist Furniture	1620 W Chicago Ave, Chicago, IL, 60622	UST
	36g	Walgreens #0258	1650 W Chicago, Chicago, IL, 60611	RCRA-SQG
	36h	Berjon, Dr Julio Estate	814 N Ashland Ave, Chicago, IL, 60622	RCRA-SQG
37	37a	Central States Joint Board	625 N Ashland, Chicago, IL, 60622	RCRA-SQG, LUST
		---	625 N Ashland Ave, Chicago, IL	SPILLS
		Central States Joint Board	625 N Ashland Ave, Chicago, IL, 60622	UST
	37b	---	649 N Ashland Ave, Chicago, IL,	SPILLS
		Ashland Gas & Mini Mart/Marathon	649 N. Ashland, Chicago, IL, 60618	UST
		Global Gas For Less	649 North Ashland, Chicago, IL, 60622	LUST
38	38a	Grand Gas	1535 W Grand, Chicago, IL, 60604	UST
		Auto Field	1535 W Grand Ave, Chicago, IL, 60622	RCRA-SQG
	38b	---	1600 W Grand Ave, North Lake, IL	SPILLS
	38c	True North Location 1944	505 N. Ashland Ave., Chicago, IL, 60610	UST
	38d	Admiral Value Co	1461 W Grand Ave, Chicago, IL, 60622	UST
39	39	Mid City Truck Body & Equip	1500 W Grand Ave, Chicago, IL, 60642	RCRA-SQG
40	40	1751-1759 West Grand Avenue, Llc	1751-1759 West Grand Avenue, Chicago, IL, 60622	SRP
41	41	Nelson Brothers Drum Inc	1420 W Hubbard, Chicago, IL, 60622	CERCLIS-NFRAP
42	42a	Hubb Enterprises Co	1456 W Kinzie St, Chicago, IL, 60622	UST
	42b	Sogo Partners, Llc	1463-1465 West Hubbard Street, Chicago, IL, 60622	SRP, INST CONTROL, ENG CONTROL
	42c	Reliable Plating Corporation Fire	1514 West Lake Street, Chicago, IL, 606071406	CERCLIS
	42d	Guardian Electric Mfg Co Inc	1532-56 W Carroll Ave, Chicago, IL, 60607	RCRA-SQG
	42e	Active Graphics	1532 W Fulton, Chicago, IL, 60607	RCRA-CESQG
	42f	Reliable Plating Corp	1538 W Lake St, Chicago, IL, 60607	RCRA-LQG
		Scott Walter G	1538 W Lake Street Greenwell James R, Chicago, IL, 60607	UST
	42g	---	1546 W Lake St, Chicago, IL	SPILLS
		Former Mary Thompson Hospital	1546 W. Lake Street, Chicago, IL, 60607	UST
		1546, Llc	1546 West Lake Street, Chicago, IL, 60607	LUST
	42h	Fantasy Diamond	1550 W Carroll, Chicago, IL, 60607	RCRA-CESQG
		Rodgers Loose Leaf	1555 W Fulton St, Chicago, IL, 60607	UST
	42i	Litho Research	1621 Carroll St, Chicago, IL, 60612	RCRA-SQG
		Land Trust No. 95205	1621 W Carroll, Chicago, IL, 60612	UST
	42j	Husar Picture Frame Co	1631 W Carroll Ave, Chicago, IL, 60612	RCRA-CESQG
	42k	Central Metal Products Co	1638 W Kinzie St, Chicago, IL, 60622	RCRA-CESQG
	42l	Midwest Electric Mfg Corp	1639 W Walnut, Chicago, IL, 60612	CERCLIS-NFRAP, CORRACTS, LUST, SRP, INST CONTROL, ENG CONTROL
		---	1639 W Walnut St, Chicago, IL	SPILLS
		Midwest Electric	1639 W Walnut St, Chicago, IL, 60612	UST
	42m	E G Property Assoc	1640 W Kinzie St, Chicago, IL, 60607	UST
		Industrial Building	1640 W Walnut, Chicago, IL, 60612	UST
	42n	Accessories Plus	1641 W Carroll, Chicago, IL, 60612	RCRA-SQG
	42o	Gaynes Testing Laboratories	1642-1652 W Fulton St, Chicago, IL, 60612	UST
		Gaynes, Chester	1642-1652 West Fulton, Chicago, IL, 60612	LUST
		Gaynes Testing Laboratories	1642 West Fulton Street, Chicago, IL, 60612	SRP, INST CONTROL, ENG CONTROL
	42p	Maas & Waldstein Co	1658 Carroll Ave, Chicago, IL, 60612	RCRA-SQG
	42p	Chicago Mailing Tube Co.	1658 Carroll Ave., Chicago, IL, 60612	LUST
	42p	Chicago Mailing Tube Co	1658 W Carroll, Chicago, IL, 60612	UST
	42q	Kloster Steel Corp	224 N Justine, Chicago, IL, 60607	RCRA-SQG

Table 2: Summary of Identified Regulated Sites

EDR Map ID	Figure 1 ID	Name*	Address*	Database**
42 cont'd	42r	---	240 N Ashland Ave, Chicago, IL	SPILLS
	42r	Peppercorn Capitol Llc	240 North Ashland, Chicago, IL, 60607	LUST
	42s	Rickard Circular Folding Co	325 N Ashland Ave, Chicago, IL, 60607	RCRA-CESQG
		Rickard Circular Folding Co	325 N Ashland Ave, Chicago, IL, 60607	UST
		Rickard Circular Folding Co.	325 North Ashland, Chicago, IL, 60607	LUST
	42t	Nobert Plating Co	340 N Ashland Ave, Chicago, IL, 60607	RCRA-LQG
	42t	Nobert Plating Company	340 North Ashland Avenue, Chicago, IL, 60609	SRP, INST CONTROL, ENG CONTROL
	42u	Communication Equipment Broker	347 N Justine, Chicago, IL, 60607	RCRA-SQG
	42v	---	355 N Ashland Ave, Chicago, IL	SPILLS
		Willson Creative Group Inc	355 N Ashland Ave, Chicago, IL, 60607	UST
		Wilson, Bill	355 North Ashland Ave., Chicago, IL, 60607	LUST
	42w	---	401-415 N Ashland, Chicago, IL	SPILLS
		Adjustable Clamp Company	401-415 N. Ashland, Chicago, IL, 60622	UST
		Adjustable Clamp Company	401-415 North Ashland, Chicago, IL, 60622	LUST
	42x	Imperial Japanning Co	415 N Ashland Ave, Chicago, IL, 60622	LUST
		Imperial Japanning Co	415 N Ashland Ave, Chicago, IL, 60622	UST
	42y	Chicago Transit Authority Cta	Ashland/Lake St Sta, Chicago, IL, 60644	RCRA-SQG
43	43	Chicago, City Of	1523 W Hubbard, Chicago, IL, 60622	RCRA-SQG
44	44a	Itw Shakeproof	1640 W Hubbard St, Chicago, IL, 6062	RCRA-SQG
		Everlock Chicago	1640 W Hubbard St, Chicago, IL, 60622	UST
		Everlock Inc.	1640 West Hubbard, Chicago, IL, 60622	LUST
	44b	Kennicott Brothers Company	1638 West Hubbard Street, Chicago, IL, 60622-6303	SRP
45	45a	Former Inx International Ink Company	1419-1443 West Carroll Avenue, Chicago, IL, 60607	SRP, INST CONTROL, ENG CONTROL
	45b	Inx International Ink Company	1420-1434 West Carroll Avenue, Chicago, IL, 60607	SRP, ENG CONTROL
46	46	Henry Horner Homes Area A East	150 N Hermitage, Chicago, IL, 60612	SRP, INST CONTROL, ENG CONTROL
47	47a	Spalding Jesse Elementary	1628 W Washington Blvd, Chicago, IL, 60612	RCRA-SQG
	47b	---	110 N Ashland Ave, Chicago, IL	SPILLS
	47c	---	Chicago, IL	SPILLS
	47d	1St Bapitst Congregational	1613 W Washington, Chicago, IL, 60612	UST
48	48	Viceroy Hotel	1519 W. Warren Ave., Chicago, IL, 60607	UST
		Viceroy Hotel	1519 West Warren Avenue, Chicago, IL, 60607	LUST, SRP
		---	1519 West Warren Blvd., Chicago, IL	SPILLS
49	49	---	1633 W Madison, Chicago, IL	ERNS
		---	1633 W Madison St, Chicago, IL	SPILLS
		Patrick Sullivan Apts Il 2-44B	1633 W Madison St, Chicago, IL, 60612	UST
		Chicago Housing Authority	1633 West Madison St., Chicago, IL, 60612	LUST
50	50a	Kranzten Studio Inc	100 S Ashland Ave, Chicago, IL, 60607	UST
		Kranzten Studio Inc.	100 South Ashland, Chicago, IL, 60607	LUST
	50b	Salvation Army	123 S Ashland Ave, Chicago, IL, 60607	UST
	50c	---	133 S Ashland, Chicago, IL	SPILLS
		Salvation Army	133 South Ashland, Chicago, IL, 60607	LUST
	50d	---	1649 W Adams St, Chicago, IL	SPILLS
		Union Medical Center Local 100A	1649 W Adams Street, Chicago, IL, 60612	UST
		Union Medical Center	1649 West Adams St., Chicago, IL, 60612	LUST
	50e	Chicago Graphic Arts Institute	206 S Ashland Ave, Chicago, IL, 60607	RCRA-CESQG
	50f	Milk Drivers Union Hall	220 South Ashland Ave., Chicago, IL, 60607	UST
51	51	Alliance Graphics	1650 West Ogden Avenue, Chicago, IL, 60612	UST
52	52a	---	Chicago, IL	SPILLS
	52b	Ashland & Vanburen Bp	1600 W Van Buren, Chicago, IL, 60608	RCRA-CESQG
		Ashland & Van Buren Properties, Llc	1600 W. Van Buren Street, Chicago, IL, 60608	UST
	52c	---	1622 W Jackson Blvd, Chicago, IL	SPILLS
	52d	Teamster City	1645 W. Jackson, Chicago, IL, 60612	UST
		Matocha Assoc.	1645 West Jackson, Chicago, IL, 60612	LUST
	52e	West Side Realty Corp	1655 N Jackson Blvd, Chicago, IL, 60612	UST
	52e	West Side Realty Corp.	1655 West Jackson, Chicago, IL, 60612	LUST
	52f	West Side Realty Corp	300 S Ashland Ave, Chicago, IL, 60607	UST
	52g	Amoco Oil Co. #18576	Vanburen & Ashland, Chicago, IL, 60612	LUST
53	53	Rush University Medical Center	1653 W Congress Parkway, Chicago, IL, 60612	SPILLS
		Rush University Medical Ctr	1653 W Congress Pkwy, Chicago, IL, 60612	RCRA-LQG
		---	1653 W Congress Pkwy, Chicago, IL	SPILLS
		Rush Presbyterian St Lukes Med Center	1653 W. Congress Pkwy, Chicago, IL, 60612	UST
		Rush University Medical Center Parcel 2	1653 West Congress Parkway, Chicago, IL, 60612	LUST, SRP, INST CONTROL, ENG CONTROL
54	54a	Rush University Medical Center	Corner Of Harrison & Ashland, Chicago, IL, 60612	LUST
			Harrison & Ashland, Chicago, IL	SPILLS
	54b	Construction Site	1620 W. Harrison, Chicago, IL, 60612	UST
55	55	Union Health Service	1634 W Polk St, Chicago, IL, 60612	RCRA-SQG
56	56a	Campus Green Apartments	901 S Ashland And 201 A, Chicago, IL, 60607	RCRA-SQG
	56b	---	900 S Ashland Ave 2nd Floor, Chicago, IL	SPILLS
		Molecular Biology Research Building	900 South Ashland Avenue, Chicago, IL, 60607	UST
	56c	---	Chicago, IL	SPILLS

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EDR Map ID	Figure 1 ID	Name*	Address*	Database**
57	57	Ok Cleaners	1528 W Taylor, Chicago, IL, 60607	RCRA-SQG, SRP, INST CONTROL, DRYCLEANERS
58	58	Illinois State Psychiatric Institute	1601 W Taylor, Chicago, IL, 60612	SPILLS
		Durso Michael School	1601 W Taylor St, Chicago, IL, 60612	RCRA-CESQG
59	59	University Of Illinois At Chicago	1110 South Paulina Street, Chicago, IL, 60612	CERCLIS-NFRAP, RCRA-LQG
60	60a	Jewel Osco 3344	1220 S Ashland Ave, Chicago, IL, 60608	RCRA-CESQG
	60b	State Of Illinois Med Dist	1222 24 S Ashland Ave, Chicago, IL, 60608	RCRA-SQG
	60c	---	1225 S Ashland Ave, Chicago, IL	SPILLS
		Pete The Greeks Restaurant	1225 S Ashland Ave Third Party Removal, Chicago, IL, 60608	UST
		Rapatas, Peter	1225 South Ashland Ave., Chicago, IL, 60608	LUST
	60d	---	1248 S Ashland Ave, Chicago, IL	SPILLS
	60e	Montefiore School	1310 S Ashland Ave, Chicago, IL, 60608	RCRA-CESQG
	60f	Building	1333-37 S Ashland, Chicago, IL, 60608	UST
	60g	Costco Warehouse	1358 S. Ashland Ave., Chicago, IL, 60608	UST
	60h	---	1510 W 13th St, Chicago, IL	SPILLS
	60i	Chicago Housing Authority	1520 W Hasting, Chicago, IL, 60608	RCRA-SQG
	60j	---	1535 W Roosevelt Rd, Chicago, IL	SPILLS
	60k	Equilon Enterprises Llc	1549 W Roosevelt, Chicago, IL, 60608	RCRA-SQG
		---	1549 W Roosevelt Rd, Chicago, IL	SPILLS
		Marathon Gas & Food	1549 West Roosevelt Ashland, Chicago, IL, 60605	UST
		Former Shell Service Station #136931	1549 West Roosevelt Rd., Chicago, IL, 60608	LUST
	60l	Illinois Medical District	1615 W Roosevelt Rd, Chicago, IL, 60608	UST
	60m	University Of Ill Inst Study Dev Disab	1640 W Roosevelt Rd, Chicago, IL, 60608	RCRA-SQG
	60n	U & I Cleaners And Tailors	1651 W Roosevelt Road Floor A8, Chicago, IL, 60608	DRYCLEANERS
	60o	---	Roosevelt & Ashland, Chicago, IL	LUST, SPILLS
61	61a	Remet Corporation Chicago	1615 W 15th St, Chicago, IL, 60608	RCRA-SQG
	61b	Costco Wholesale 1107	1430 S Ashland Ave, Chicago, IL, 60608	RCRA-SQG
		---	1430 S. Ashland, Chicago, IL	SPILLS
		Costco	1430 S. Ashland Avenue, Chicago, IL, 60608	UST
		Novak Construction	1430 South Ashland, Chicago, IL, 60608	LUST
	61c	Vacant Land	1422 S Ashland, Chicago, IL, 60608	UST
62	62	Lakeside Lithography Llc	1600 S Laflin St, Chicago, IL, 606082123	RCRA-LQG, LUST
63	63a	Cvs Pharmacy 8515	1713 S Ashland, Chicago, IL, 60608	RCRA-CESQG
	63b	Speed Hand Car Wash	1700 South Ashland Avenue, Chicago, IL, 60608	LUST
	63c	Former Dearborn Wholesale Grocers	1601 S. Ashland Ave., Chicago, IL, 60608	UST
		Dearborn Wholesale Grocers Warehouse	1601 South Ashland Avenue, Chicago, IL, 60608	SRP
	63d	---	1701 S Ashland Ave, Chicago, IL	SPILLS
	63e	Speed Hand Car Wash & Glass Shop	1700-08 S Ashland Ave, Chicago, IL, 60608	UST
64	64a	Orozco Community Academy	1645 W 18th Pl, Chicago, IL, 60608	RCRA-SQG
	64b	Cooper	1624 W 19th St, Chicago, IL, 60608	RCRA-SQG
65	65a	---	Chicago, IL	SPILLS
	65b	Amoco 18584	1602 W Cermak And Ashland, Chicago, IL, 60608	RCRA-SQG
		Sasafrasnet Beep-Beep, Llc	1602 W. Cermak Rd., Chicago, IL, 60608	UST
	65c	Ser Glass Co	1645 W Cermak Rd, Chicago, IL, 60608	UST
	65d	Pilsen Brakes Muffler & Auto Repair	2100 S. Ashland, Chicago, IL, 60608	UST
		Pilsen Auto Repair	2100 South Ashland, Chicago, IL, 60608	LUST
	65e	Pilsen Auto Glass	2120 S. Ashland, Chicago, IL, 60608	UST
	65f	Reliable Welding	2136 S Ashland Ave, Chicago, IL, 60608	UST
	65g	Lesters Super Auto	2201 S Ashland, Chicago, IL, 60608	UST
	65h	Marks Used Auto Parts	2221 S Ashland Ave, Chicago, IL, 60608	RCRA-SQG
		Lester Super Auto Parts	2221 S Ashland Ave, Chicago, IL, 60608	UST
	65i	Ron Postman Pontiac	2232 Blue Island Ave, Chicago, IL, 60608	UST
	65j	---	Cermak & Ashland Ave, Chicago, IL	SPILLS
		Amoco Oil Co. #18584	Cermak Rd.& Ashland Ave., Chicago, IL, 60616	LUST
66	66	---	1655 W 21St St, Near Garage, Chicago, IL	ERNS
67	67	Continental Glass & Plastic	1440 West 21St Place, Chicago, IL, 60608-	SRP, ENG CONTROL
68	68	---	2150 S Laflin, Chicago, IL	SPILLS
	68	---	2150 S Laslin, Chicago, IL	SPILLS
	68	Benito Juarez High School	2150 South Laflin Avenue, Chicago, IL, 60608	LUST, SRP, INST CONTROL, ENG CONTROL
69	69	Loop Transfer-Laflin (Active)	2251 S. Laflin St., Chicago, IL	SWF/LF
70	70	Czarnowski Display Service Inc.	2287 South Blue Island Ave., Chicago, IL, 60608	LUST, SRP, ENG CONTROL
71	71	Auto Wares Illinois	2301 S Ashland, Chicago, IL, 60608	RCRA-SQG
72	72a	Chicago Water Dept	2352 S Ashland, Chicago, IL, 60608	RCRA-SQG
		Chicago Machinery	2352 S Ashland, Chicago, IL, 60608	RCRA-SQG
		---	2352 S Ashland Ave, Chicago, IL	SPILLS
		Central District Water Distribution	2352 S. Ashland Ave., Chicago, IL, 60608	UST
		Chicago Dept. Of Fleet Management	2352 South Ashland Ave., Chicago, IL, 60608	LUST
	72b	Construction Site	2356-2398 S. Ashland Ave., Chicago, IL, 60608	UST
	72c	---	2356-2408 S Ashland Ave, Chicago, IL	SPILLS
		W.W. Grainger	2356-2408 South Ashland Avenue, Chicago, IL, 60608	LUST

Table 2: Summary of Identified Regulated Sites

EDR Map ID	Figure 1 ID	Name*	Address*	Database**
72 cont'd	72d	Chicago Dept Of Streets & Sanitation	2401 S Ashland, Chicago, IL, 60608	UST
		---	2401 S Ashland Ave, Chicago, IL	SPILLS
		Chicago, City Of	2401 South Ashland Ave., Chicago, IL, 60608	LUST
	72e	Chicago Bureau Of Electricity	2451 S Ashland, Chicago, IL, 60608	RCRA-SQG
		---	2451 South Ashland Ave, Chicago, IL	ERNS
73	73	City Waste Transfer (Active)	2464 S. Laflin St., Chicago, IL	SWF/LF
74	74a	August Battaglia Distributing Company	2545 South Ashland Avenue, Chicago, IL, 60608	CERCLIS-NFRAP
	74b	---	2550 South Ashland Avenue, Chicago, IL, 60608	ERNS
		Chicago Yacht Yard	2550 South Ashland Avenue, Chicago, IL, 60608-	SRP, INST CONTROL, ENG CONTROL
75	75	Il Central Gulf Railroad	27th & Ashland (3000 S Damen), Chicago, IL, 60601	UST
76	76a	Illinois Dept. Of Conservation	East Of Ashland Ave., Chicago, IL, 60607	LUST
	76b	Chicago Origin Site- I&M Canal	2733 S Ashland, Chicago, IL, 60608	UST
77	77	Jefferson Smurfit Corp	2828 S Lock, Chicago, IL, 60608	RCRA-SQG, LUST, SRP
78	78a	Sears Roebuck & Co	2800 S Ashland Ave, Chicago, IL, 60608	RCRA-SQG
		---	2800 S Ashland Ave, Chicago, IL	SPILLS
		Sun Times, Inc.	2800 S. Ashland, Chicago, IL, 60608	UST
		Sears Roebuck And Company	2800 South Ashland Avenue, Chicago, IL, 60608	LUST, SRP
	78b	Marano Market	2820 S Ashland Ave, Chicago, IL, 60608	UST
	78c	Compass Rose Boat Club	2841 S Ashland Ave, Chicago, IL, 606085322	CERCLIS-NFRAP
		Engineered Polymer Solutions Inc	2841 S Ashland Ave, Chicago, IL, 60608	SPILLS
		A Div Of Valspar	2841 S Ashland Ave, Chicago, IL, 60608	UST
		---	2841 South Ashland Ave, Chicago, IL	ERNS
	78d	Signal Delivery Service Inc	2900 S Ashland Ave, Chicago, IL, 60608	RCRA-SQG
		Signal Delivery Ser	2900 S Ashland Ave, Chicago, IL, 60608	UST
	78e	Illinois Central Railroad	2901 S Ashland, Chicago, IL, 60611	UST
	78f	---	3000 S Ashland Ave, Chicago, IL	SPILLS
		Vacant Warehouse Building	3000 S Ashland Ave, Chicago, IL, 60604	UST
		Ashland Market Place	3000 South Ashland, Chicago, IL, 60608	LUST
	78g	Unknown	31St & Ashland Avenue, Chicago, IN, 60608	SPILLS
79	79	Peoples Gas And Light	3000-3050 Pitney Court, Chicago, IL, 60608	MGP
		Peoples Gas And Light	3000-3050 Pitney Court, Chicago, IL, 60608-	SRP
		Peoples Gas Pitney Court Former Mgp	3052 Pitney Court, Chicago, IL, 60608	CERCLIS, PRP
		Peoples Gas And Light	Ne Corner Lituanica & 32nd Streets, Chicago, IL, 60608	SRP, INST CONTROL, ENG CONTROL
80	80a	Amalgamated Trust #5361	3130 South Ashland, Chicago, IL, 60608	LUST
	80b	Heartland Food Corporation	3141 South Ashland Avenue, Chicago, IL, 60608-	SRP, ENG CONTROL
	80c	Riverside Square	3145 S Ashland Ave - B, Chicago, IL, 60608	RCRA-SQG
		Family Pride Laundry & Cleaners	3145 South Ashland Ave, Chicago, IL	SRP, INST CONTROL, ENG CONTROL
	80d	Cook County Sheriffs Police	3146 S Archer, Chicago, IL, 60608	RCRA-SQG
	80e	Metro Auto Body Group	3147 S Archer, Chicago, IL, 60608	RCRA-SQG
	80f	Shell Station 1545-55	3150 So Ashland, Chicago, IL, 60648	UST
81	81a	---	1540 W 33rd St, Chicago, IL	SPILLS, UST
		Global Pacific Bank	1540 West 33rd Street, Chicago, IL, 60608	LUST
	81b	---	3200 S Ashland Ave, Chicago, IL	SPILLS
		---	3200 South Ashland Ave, Chicago, IL	SPILLS
	81c	---	3233 S Ashland Ave, Chicago, IL	SPILLS
		Pacific Global Bank	3233 S. Ashland Avenue, Chicago, IL, 60608	UST
		Pacific Global Bank	3233 South Ashland Avenue, Chicago, IL, 60608	LUST
82	82	---	1618 West 33 Place, Chicago, IL	SPILLS
83	83	Acme Refining Company	3357 S Justine, Chicago, IL, 60608	SRP, NPDES, INST CONTROL, ENG CONTROL
84	84	Modern Body	3440 S Ashland, Chicago, IL, 60608	RCRA-SQG
85	85a	---	3510 S Ashland Ave, Chicago, IL	SPILLS
		---	3510 S Ashland Ave, Chicago, IL	SPILLS
		35Th & Ashland Oil, Inc.	3510 S. Ashland Avenue, Chicago, IL, 60609	UST
		Martin Oil (Keralite Oil Co.)	3510 South Ashland Ave., Chicago, IL, 60631	LUST
	85b	Wrigley Co	3535 S Ashland Ave, Chicago, IL, 606091381	CERCLIS-NFRAP, CORRACTS, LUST
		---	3535 S Ashland Ave, Chicago, IL	SPILLS
		Wm. Wrigley, Jr. Co.	3535 S. Ashland Avenue, Chicago, IL, 60609	UST
		---	3538 S Ashland Ave, Chicago, IL	SPILLS
		Wm Wrigley Jr Co	3538 S Ashland Ave, Chicago, IL, 60609	UST
		William Wrigley Jr. Co.	3538 South Ashland Ave., Chicago, IL, 60609	LUST
	85c	Gas City Ltd.	35th & Ashland, Chicago, IL, 60629	LUST
86	86	36Th/Ashland Ave	Chicago, IL	IL NIPC
87	87a	Public Storage	3659 S Ashland Ave, Chicago, IL, 60607	RCRA-CESQG
		Public Storage	3659 South Ashland Avenue, Chicago, IL, 60609	SRP
	87b	Pro Tech Auto Repair	3700 S Ashland, Chicago, IL, 60609	RCRA-SQG, LUST
	87c	David Goldberg Ent Inc	3700 S Ashland Ave, Chicago, IL, 60609	UST
	87d	---	3701 S Ashland Ave, Chicago, IL	SPILLS
		Advanced Curing Systems Inc	3701 S Ashland Ave, Chicago, IL, 60609	UST
		Advanced Curing Systems	3701 South Ashland Ave., Chicago, IL, 60609	LUST

Table 2: Summary of Identified Regulated Sites

EDR Map ID	Figure 1 ID	Name*	Address*	Database**
87 cont'd	87e	Union Wadding Co	3711 S Ashland, Chicago, IL, 60609	RCRA-CESQG
	87f	Harris Lamkps	3757 S Ashland Ave, Chicago, IL, 60609	UST
88	88a	Industrial	1624 W 38th & 1437 W 37th St., Chicago, IN, 60609	SPILLS
	88b	Unknown	1624 W 38th St, Chicago, IN	SPILLS
		Unknown	1624 W 38th St, Chicago, IN	SPILLS
		Unknown	1624 W 38th St, Chicago, IN	SPILLS
		---	1624 West 38th St, Chicago, IL	ERNS
		---	1624 West 38th Street, Chicago, IL, 60609	ERNS
		---	1624 West 38th Street, Chicago, IL, 60609	ERNS
		---	1624 West 38th Street, Chicago, IL	ERNS
	88c	Advertising Flag Co	3801 S Ashland Ave, Chicago, IL, 60609	RCRA-SQG
	88d	Mcdade & Cowarehouse	3815 S Ashland Ave, Chicago, IL, 60609	UST
89	89	North Shore Group	1420 W. 38th St., Chicago, IL, 60609	CERCLIS-NFRAP
		Usepa North Shore Group	1420 West 38th Street, Chicago, IL, 60609	SRP, INST CONTROL
90	90	Bierdeman Paper Box Company	1511 W. 38th Street, Chicago, IL, 60609	UST
91	91	James Mcnaughton Builders	1700 West Pershing, Chicago, IL, 60609	LUST, SRP
92	92a	Chicago Dept Of Water Mgt	3901 S Ashland, Chicago, IL, 60609	RCRA-CESQG
		Fuel Site #4	3901 S Ashland, Chicago, IL, 60609	UST
		---	3901 South Ashland, Chicago, IL	LUST, SPILLS
	92b	---	3900 South Ashland Ave, Chicago, IL	ERNS
		Chicago Indoor Soccer	3900 South Ashland Avenue, Chicago, IL, 60609	SRP, INST CONTROL, ENG CONTROL
93	93a	J P Rubbish Company	Chicago, IL	IL NIPC, CERCLIS-NFRAP
	93b	---	Chicago, IL	SPILLS
	93c	---	Chicago, IL	SPILLS
	93d	---	Chicago, IL	SPILLS
	93e	---	Chicago, IL	SPILLS
	93f	---	Chicago, IL	SPILLS
	93g	---	Chicago, IL	SPILLS
	93h	Ashland Cold Storage Co	1556 W 43rd St, Chicago, IL, 60609	UST
		Ashland Cold Storage Company	1556 West 43rd Street, Chicago, IL, 606093389	RCRA-CESQG
	93i	Tulsa Power Ser Inc	3968 S Ashland, Chicago, IL, 60609	UST
	93j	---	4008 South Ashland, Chicago, IL	ERNS
		Chicago, City Of	4008 South Ashland Avenue, Chicago, IL, 60609	SRP
	93k	Pink Panther Truck Repair	4015 S Ashland Ave, Chicago, IL, 60609	RCRA-SQG
		---	4016 South Ashland Ave, Chicago, IL	ERNS
	93l	Ns Ashland Yard	4024 Ashland Ave, Chicago, IL, 60609	RCRA-CESQG
		---	4024 Ashland Ave, Chicago, IL	SPILLS, SRP
		---	4024 S Ashland Ave, Chicago, IL	SPILLS
		Conrail Ashland Ave Yard	4024 S Ashland Ave, Chicago, IL, 60609	UST
	93m	Chicago School Transit Inc	4055 S Ashland Ave, Chicago, IL, 60609	RCRA-CESQG
		Chicago School Transit Inc	4055 S Ashland Ave, Chicago, IL, 60609	UST
	93n	Zayre Dept Store 355	4100 S Ashland Ave, Chicago, IL, 60609	UST
	93o		4107 Ashland Ave, Chicago, IL	SPILLS
	93p	Concession Svcs Inc	4132 S Ashland Ave, Chicago, IL, 60609	RCRA-SQG
		Oasis Station #1068	4132 S Ashland Ave, Chicago, IL, 60609	UST
		Concessions Services Inc.	4132 South Ashland Ave., Chicago, IL, 60641	LUST
	93q	---	4200 S Ashland Ave, Chicago, IL	SPILLS
		---	4200 S Ashland Ave, Chicago, IL	SPILLS, UST
		42 Ashland Venture Llc	4200 South Ashland Avenue, Chicago, IL, 60609	LUST
	93r	Culinary Foods Inc	4201 S Ashland Ave, Chicago, IL, 60609	SPILLS
	93s	---	4215-4229 S Marfhield Ave, Chicago, IL	SPILLS
		Trembacki, David	4215-4229 South Marshfield, Chicago, IL, 60609	LUST
		Vacant Lot	4215 - 4229 S. Marshfield Avenue, Chicago, IL, 60609	UST
	93t	---	4301 S Ashland Ave, Chicago, IL	SPILLS
	93u	Giant Auto Supply	4305 S Ashland, Chicago, IL, 60609	RCRA-CESQG
94	94	---	Chicago, IL	SPILLS
		---	Chicago, IL	SPILLS
		---	Chicago, IL	SPILLS
		---	Chicago, IL	SPILLS
		---	Chicago, IL	SPILLS
		---	Chicago, IL	SPILLS
		---	Chicago, IL	SPILLS
		---	4024 Ashland Avenue, Chicago, IL	SPILLS
		---	4024 Ashland Avenue, Chicago, IL	SPILLS
95	95	Custom Organics Inc	1445 W 42nd St, Chicago, IL, 60609	CERCLIS-NFRAP, RCRA-TSDF, CORRACTS, RCRA-LQG
96	96a	Back Of The Yards Daycare	1633 West 43rd Street, Chicago, IL, 60609	SRP, INST CONTROL, ENG CONTROL
	96b	Empty Lot	43144318 South Paulina Street, Chicago, IL, 60609	SRP

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EDR Map ID	Figure 1 ID	Name*	Address*	Database**
97	97a	---	Chicago, IL	SPILLS
	97b	Ges Exposition Svcs	1555 W 44th St, Chicago, IL, 60609	RCRA-SQG, LUST
			1555 W 44th St, Chicago, IL	SPILLS
		Ges Exposition Service Co	1555 W 44th St, Chicago, IL, 60609	UST
	97c	---	4400 S Ashland Ave, Chicago, IL	SPILLS
		Vacant Lot	4400 S Ashland Ave, Chicago, IL, 60609	UST
		New Century Construction	4400 South Ashland Ave., Chicago, IL, 60609	LUST
	97d	Engine Co 49	4401 S Ashland, Chicago, IL, 60602	UST
		---	4401 S Ashland Ave, Chicago, IL	SPILLS
		Chicago, City Of	4401 South Ashland Ave., Chicago, IL, 60609	LUST
	97e	---	4443 S Ashland Ave, Chicago, IL	SPILLS
		---	4443 S Ashland Ave, Chicago, IL	SPILLS
		Klean Car Wash, Inc.	4443 South Ashland Ave., Chicago, IL, 60609	LUST, UST
	97f	Jtk Engine Pros	4456 S Ashland Ave, Chicago, IL, 60609	RCRA-SQG
	97g	---	4500 S Ashland, Chicago, IL	SPILLS
98	98	Davis Square Park Field House	4430 S Marshfield, Chicago, IL, 60609	UST
		Davis Square Park	4430 S Marshfield Ave, Chicago, IL, 60609	RCRA-CESQG
99	99	---	1542 W 47th St, Chicago, IL	SPILLS
		Former Cole Tayler Bank	1542 W. 47th Street, Chicago, IL, 60609	UST
		Cole Taylor Bank	1542 West 47th Street, Chicago, IL, 60609	LUST, SRP, INST CONTROL, ENG CONTROL
100	100a	Walgreens 6641	1614 W 47th St, Chicago, IL, 60609	RCRA-SQG
	100b	---	4717 S Ashland Ave, Chicago, IL	SPILLS
		Balaban Furniture	4717 S. Ashland Ave., Chicago, IL, 60609	UST
		Balaban Furniture	4717 South Ashland Avenue, Chicago, IL, 60609	LUST
	100c	Former Goldblatt Store	4700 S. Ashland Avenue, Chicago, IL, 60613	UST
101	101	Chavez	4747 S Marshfield, Chicago, IL, 60609	RCRA-SQG
102	102a	Goodyear Auto Service Center	4810 S Ashland Ave, Chicago, IL, 60609	RCRA-SQG
		Goodyear Asc 6149	4810 S Ashland Ave, Chicago, IL, 60609	UST
		Goodyear Tire & Rubber	4810 South Ashland, Chicago, IL, 60609	LUST
	102b	John Hamline Branch Sch	1548 W 48th St, Chicago, IL, 60609	RCRA-CESQG
	102c	Former Furniture Store	4805 S. Ashland Avenue, Chicago, IL, 60609	UST
103	103	Chicago City Of Abandonment	4953 S Justine St, Chicago, IL, 60609	RCRA-SQG
104	104	Swiss Cleaners	1542 W 51St St, Chicago, IL, 60609	RCRA-SQG
105	105	---	5121 South Marshfield, Chicago, IL	ERNS
106	106	Port Missions	5140 S Ashland Third Party Removal, Chicago, IL, 60629	UST
107	107a	Bonniebrook Ford	5343 S Ashland, Chicago, IL, 60609	RCRA-SQG
		Monteverde John Dr	5343 S Ashland Ave, Chicago, IL, 60609	UST
		Monteverde, John	5343 South Ashland, Chicago, IL, 60609	LUST
	107b	Amoco 15872	5257 S Ashland, Chicago, IL, 60609	RCRA-SQG
		Bp Amoco Oil Co.	5257 South Ashland, Chicago, IL, 60609	LUST, UST
	107c	Murrays 434	5346 S Ashland Ave, Chicago, IL, 60609	RCRA-SQG
	107d	---	5301 S Ashland Ave, Chicago, IL	SPILLS
		P&J Investments	5301 South Ashland Ave., Chicago, IL, 60609	LUST
108	108	Wreck & Roll Auto Body South	5436 S Ashland Ave, Chicago, IL, 60609	RCRA-CESQG
109	109a	Shell Station 1544-51	1602-08 W Garfield Blvd, Chicago, IL, 60636	UST
	109b	Phillips 66	5501 S. Ashland, Chicago, IL, 60636	UST
110	110a	Cvs Pharmacy 5989	1620 W 59Th St, Chicago, IL, 60631	RCRA-CESQG
	110b	Warehouse Facility	1615 W. 59Th Street, Chicago, IL, 60636	UST
		Novogroder Companies	1615 West 59Th Street, Chicago, IL, 60636	LUST
	110c	Citgo	5901 S Ashland, Chicago, IL, 60636	UST
111	111	Engine Co 116	5955 S Ashland, Chicago, IL, 60636	UST
		---	5955 S Ashland Ave, Chicago, IL	SPILLS
		---	5955 S Ashland Ave, Chicago, IL	SPILLS
		---	5955 S Ashland Ave, Chicago, IL	SPILLS
		Chicago, City Of Fire Dept.	5955 South Ashland Ave., Chicago, IL, 60636	LUST
112	112	General Automotive Machinists Inc	6032 S Ashland Ave, Chicago, IL, 60636	RCRA-SQG
113	113	A.H. Petro Group , Inc.	6124 S. Ashland Avenue Lessee, Chicago, IL, 60636	UST
114	114	---	6200 S Ashland Ave, Chicago, IL	SPILLS
		Waggoner Automotive	6200 S Ashland Ave, Chicago, IL, 60636	UST
		Waggoner'S Automotive Service, Inc.	6200 South Ashland Ave., Chicago, IL, 60636	LUST
115	115	West Engleweed United Organization	1650 W 62nd St Third Party Removal, Chicago, IL, 60636	UST
116	116	West Englewood Family Resource Center	17011725 West 63rd Street, Chicago, IL, 60636	SRP, INST CONTROL
117	117	Bunche	6515 S Ashland, Chicago, IL, 60636	RCRA-SQG
118	118a	---	1600 W Marquette Ave, Chicago, IL	SPILLS
		New Kfc	1600 W Marquette Road, Chicago, IL, 60636	UST
		Kfc Corp.	1600 West Marquette Rd., Chicago, IL, 60636	LUST
	118b	---	6630 S Ashland, Chicago, IL	SPILLS
	118c	Citgo Gas Station	6700 S. Ashland Avenue, Chicago, IL, 60636	UST
119	119	Chicago Public Schools	6758 South Paulina Street, Chicago, IL, 60636	LUST, SRP, INST CONTROL, UST

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EDR Map ID	Figure 1 ID	Name*	Address*	Database**
120	120a	Chicago Transit Authority	1601 W 69Th St, Chicago, IL, 60636	RCRA-SQG
		---	1601 W 69Th St, Chicago, IL	SPILLS
		Chicago Transit Authority	1601 West 69Th St. & Ashland, Chicago, IL, 60636	LUST
		Chicago Transit Authority	1601 West 69Th Street, Chicago, IL, 60636	SRP, INST CONTROL, ENG CONTROL
		Cta - 69Th & Ashland Garage	1601 West 69Th Street, Chicago, IL, 60626	UST
	120b	Food 4 Less #552 Gas Station	6942-6944 S. Ashland Ave., Chicago, IL, 60636	UST
		Ralphs Grocery Co 552 Fuel Ctr	6944 S Ashland Ave, Chicago, IL, 60636	RCRA-CESQG
	120c	Vacant Building	6826 S. Ashland, Chicago, IL, 60636	UST
121	121	Wheeler House	1420 West 69Th Street, Chicago, IL, 60636	SRP, INST CONTROL, ENG CONTROL
122	122a	Amoco Oil Co. #24046	7059 Ashland Ave., Chicago, IL, 60636	LUST, UST
		---	7059 S Ashland, Chicago, IL,	SPILLS
		Amoco	7059 S Ashland Ave, Chicago, IL, 60636	RCRA-SQG
	122b	Food 4 Less 552	7030 S Ashland, Chicago, IL, 60636	RCRA-CESQG
	122c	Food4Less	1600 West 71St Street, Chicago, IL, 60636	SRP, INST CONTROL, ENG CONTROL
	122d	---	7101 S Ashland, Chicago, IL	SPILLS
		Shell Oil Products Us	7101 South Ashland, Chicago, IL, 60626	LUST, UST
123	123a	Giant Auto Supply	73rd And Ashland, Chicago, IL, 60636	RCRA-SQG
	123b	Laricom Inc	7240 S Ashland Ave, Chicago, IL, 60636	RCRA-SQG
	123c	Givens Herman	7225 S Ashland Ave, Chicago, IL, 60620	UST
		Givens, Herman	7225 South Ashland Ave., Chicago, IL, 60636	LUST
	123d	Ashland Moving & Storage	7301 S Ashland, Chicago, IL, 60636	UST
124	124	Walls Transportation	1515 W 74Th St, Chicago, IL, 60636	RCRA-SQG
125	125	Blackhawk Steel Corp	1700 W 74Th Place, Chicago, IL, 60636	RCRA-SQG
126	126a	Chicago Fire Brick Co.	7531 Ashland Ave., Chicago, IL, 60620	LUST, SRP, INST CONTROL, ENG CONTROL
		Chicago Fire Brick Co	7531 S Ashland Ave, Chicago, IL	UST
		Chicago Fire Brick Co	7531 S. Ashland Ave., Chicago, IL, 60620	RCRA-CESQG
	126b	Investors Truss Corp	7540 7558 S Ashland, Chicago, IL, 60640	RCRA-SQG
	126c	---	7558 S Ashland Ave, Chicago, IL	SPILLS
		Investors Truss Corp.	7558 South Ashland Ave., Unit A7, Chicago, IL, 60620	LUST
	126d	John & Sons Body Shop	7520 S Ashland, Chicago, IL, 60620	UST
		John & Sons Auto Body Shop Inc	7520 S Ashland Ave, Chicago, IL, 60620	RCRA-CESQG
		---	7520 S Ashland Ave, Chicago, IL	SPILLS
		---	7520 S Ashland Ave, Chicago, IL	SPILLS
		Thurman, John	7520 South Ashland Ave., Chicago, IL, 60620	LUST
	126e	Commercial Building	7601-7641 S. Ashland, Chicago, IL, 60620	UST
		---	7601 S Ashland, Chicago, IL	SPILLS
	126f	Aldi, Inc.	7627 Ashland Avenue, Chicago, IL, 60620	LUST, SPILLS
		7627 S. Ashland Avenue	7627 S. Ashland Avenue, Chicago, IL, 60620	UST
127	127	Chem Pac Site	1750 West 75Th Place, Chicago, IL, 60620	CERCLIS-NFRAP
128	128a	---	7702 S Ashland, Chicago, IL	SPILLS
		Vacant (Construction In Progress)	7702 S. Ashland Avenue, Chicago, IL, 60620	UST
		Ls General Construction, Inc.	7702 South Ashland, Chicago, IL, 60609	LUST
	128b	Food Service Professionals	7721 South Ashland Avenue, Chicago, IL, 60620	UST
129	129a	Quik Wash Iii	1635 West 79Th Street, Chicago, IL, 60620	SRP
	129b	Phillips 66	7902 S. Ashland, Chicago, IL, 60620	UST
130	130	Cvs Pharmacy 8506	8025 S Ashland, Chicago, IL, 60620	RCRA-CESQG
		---	8025 S Ashland Ave, Chicago, IL	SPILLS
		Parking Lot Of Commercial Store	8025 S. Ashland, Chicago, IL, 60620	UST
131	131	---	8100 S Ashland Ave, Chicago, IL	SPILLS
		Marathon Gas Mart	8100 S. Ashland Ave., Chicago, IL, 606204320	UST
		Martin Oil	8100 South Ashland Ave., Chicago, IL, 60620	LUST
132	132	Poly Cleaners	8206 S Ashland Ave, Chicago, IL, 60620	RCRA-CESQG
133	133	U.S. Postal Service, Auburn Park	8345 South Ashland, Chicago, IL, 60620	LUST
134	134	Cuffe	1540 W 84Th St, Chicago, IL, 60620	RCRA-SQG
135	135	---	8510 S Ashland, Chicago, IL	SPILLS
		Chicago J & B Petroleum	8510 S. Ashland, Chicago, IL, 60620	UST
		Courtesy Services	8510 South Ashland, Chicago, IL, 60620	LUST
136	136a	Shell Station 1545-39	8700-10 S Ashland Ave, Chicago, IL, 60620	UST
		---	8700 S Ashland Ave, Chicago, IL	SPILLS
		Equilon Enterprises Llc	8700 S Ashland Avenue, Chicago, IL, 60620	LUST
	136b	Amoco 15957	8701 S Ashland, Chicago, IL, 60620	RCRA-SQG
		Amoco Oil Co.	8701 South Ashland, Chicago, IL, 60620	LUST, UST
	136c	Walgreens 6376	8636 S Ashland Ave, Chicago, IL, 60620	RCRA-SQG
	136d	---	8649 S. Ashland Ave., Chicago, IL	SPILLS
		Aden Gas, Inc. D/B/A Ashland Phillips	8649 S. Ashland Ave., Chicago, IL, 60620	UST
		Bulk Petroleum Corp.	8649 South Ashland, Chicago, IL, 60620	LUST
	136e	Auburn Commons Lp	16221642 West 87Th Street, Chicago, IL, 60620	SRP, INST CONTROL, ENG CONTROL
		Auburn Commons Lp	1634-42 W 87Th St, Chicago, IL, 60620	UST
	136f	86 Ashland Llc	8600-8642 South Ashland, Chicago, IL, 60620	LUST
136 cont'd	136g	---	8640 S Ashland, Chicago, IL	SPILLS
		Proposed Walgreens Site	8640 S. Ashland, Chicago, IL, 60620	UST
	136h	Danny Boy Oil Co	1642 W 87Th, Chicago, IL, 60606	UST
	136i	Love Center	8620 S Ashland, Chicago, IL, 60620	UST

Table 2: Summary of Identified Regulated Sites

EDR Map ID	Figure 1 ID	Name*	Address*	Database**
137	137a	Il Bell Telephone Co	1550 W 88Th, Chicago, IL, 60620	UST
		Il Bell	1550 W 88Th St, Chicago, IL, 60620	RCRA-SQG
		---	1550 W 88Th St, Chicago, IL	SPILLS
		Illinois Bell Telephone	1550 West 88Th St., Chicago, IL, 60620	LUST
	137b	Kingsgard Cleaners Inc	8800 S Ashland Ave, Chicago, IL	DRYCLEANERS
138	138a	---	9000 S Ashland Ave, Chicago, IL	SPILLS
		Ashland State Bank	9000 South Ashland Ave., Chicago, IL, 60620	LUST
	138b	---	8906 S Ashland Ave, Chicago, IL	SPILLS
		Warehouse Facility	8906 S. Ashland, Chicago, IL, 60620	UST
		Novogroder Company, Inc.	8906 South Ashland Avenue, Chicago, IL, 60620	LUST
	138c	Citgo Gas Station & Mini Mart	8950 S. Ashland Avenue, Chicago, IL, 60620	UST
139	139	Apartment Building	9000-9004 S. Justine, Chicago, IL, 60620	UST
140	140	---	9131 S Ashland, Chicago, IL	SPILLS
		Auto Repair Site	9131 S Ashland, Chicago, IL, 60620	UST
		Desmond Konadu	9131 South Ashland, Chicago, IL, 60620	LUST
141	141a	Welcome Chevrolet Inc	9220 S Ashland Ave, Chicago, IL, 60620	RCRA-SQG
	141b	Dupes Auto Enterprises	9200 S Ashland Ave, Chicago, IL, 60620	RCRA-CESQG
		Beverly Auto	9200 S Ashland Ave, Chicago, IL, 60636	UST
		Beverly Point Auto Repair	9200 South Ashland Ave., Chicago, IL, 60620	LUST
	141c	Parking Lot	9201-9211 S Ashland, Chicago, IL, 60620	UST
		Shiloah Baptist Church	9201-9211 South Ashland Ave., Chicago, IL, 60620	LUST
		---	9201 S Ashland Ave, Chicago, IL	SPILLS
142	142	9200 S Vanderpoel	9200 S Vanderpoel, Chicago, IL, 60643	US BROWNFIELDS
143	143a	Shell Station 1543-04	9502 S Ashland 95Th, Chicago, IL, 60643	UST
		Shell Oil Co	9502 S Ashland And 95Th St, Chicago, IL, 60643	LUST
		---	9502 S Ashland Ave, Chicago, IL	SPILLS
	143b	Walgreens # 4306	1633 W 95th St, Chicago, IL, 60643	RCRA-SQG
		1633 West 95Th Street	1633 West 95th Street, Chicago, IL, 60610	SRP, ENG CONTROL
	143c	Jewel Foods	9410 South Ashland, Chicago, IL, 60620	LUST
	143d	---	1551 W 95th St, Chicago, IL	SPILLS
		Thrid Baptist Church	1551 W 95h St, Chicago, IL, 60643	UST
		Third Baptist Church Of Chicago	1551 West 95th Street, Chicago, IL, 60643	LUST
	143e	---	1615 W 95th St, Chicago, IL	SPILLS
	143f	Jewel Express 3176	1604 W. 95th Street, Chicago, IL, 60619	UST
144	144	Burnham Cleaners	1450 W 95Th St, Chicago, IL, 60643	RCRA-SQG, SRP, DRYCLEANERS

*Name, Address is as reported in EDR Database report

**See Table 1 for database definitions

Table 3: Sites of Greatest Concern

Name	Address	Database	Nearest Proposed BRT Station	Location*	Site Status **
MEDILL MATERIAL RECOVERY & RECYCLING FACILITY (ACTIVE)	1633 W. Medill Ave., Chicago, IL	SWF/LF	Fullerton	Approximately 200 feet from proposed station	No information
FORT DEARBORN MFG	1574 Homer Street, Chicago, IL, 60622	CERCLIS-NFRAP	Cortland	On Ashland, approximately 390 feet north proposed station	Not on NPL, Archived
NOBERT PLATING CO	340 N Ashland Ave, Chicago, IL, 60607	RCRA-LQG	Lake	On Ashland, approximately 950 feet north from proposed station	5 violations, compliance received
AUGUST BATTAGLIA DISTRIBUTING COMPANY	2545 South Ashland Avenue, Chicago, IL, 60608	CERCLIS-NFRAP	Blue Island	On Ashland, approximately 2,250 ft from proposed station)	Non on NPL, Archived
COMPASS ROSE BOAT CLUB	2841 S Ashland Ave, Chicago, IL, 60608	CERCLIS-NFRAP	31st	On Ashland, within 500 feet of proposed station	Not on NPL, Archived
WRIGLEY CO	3535 S Ashland Ave, Chicago, IL, 60608	CERCLIS-NFRAP, CORRACTS	35th	On Ashland, within 200 feet of proposed station	Not on NPL, Archived Deferred to RCRA CORRACTS - Assigned low priority
36TH/ASHLAND AVE	Chicago, IL	IL NIPC	35th	Potentially, based on available information, could be 600 feet from proposed station	No information
J P RUBBISH COMPANY	Chicago, IL	IL NIPC, CERCLIS-NFRAP	Pershing	Potentially, based on available information, could be 600 feet from proposed station	No information

*Location is based on the address and longitude/latitude provided by EDR.

**Site Status is based on EDR report; Archived status means that the United States Environmental Protection Agency (USEPA) has completed its assessment of the site and has determined that no future action will be taken to list it on the National Priorities List and has removed it from its inventory of Superfund sites. However, this does not mean that a site is considered clean, and additional caution should be taken before acquiring ownership.

Table 4: Database Listings by Station

	Database*	Search Distance From Station (miles)	Station**												
			Irving Park	Addison	Roscoe	Belmont	Diversey	Fullerton	Cortland	North	Division	Chicago	Grand	Lake	Madison
Federal Databases	NPL	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	Delisted NPL Sites	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	CERCLIS	0.25	---	---	---	---	---	1	---	---	---	---	---	1	---
	CERCLIS-NFRAP	0.25	---	---	---	---	---	---	2	---	---	---	1	1	---
	RCRA CORRACTS	0.25	---	---	---	---	---	---	1	---	---	---	---	1	---
	RCRA-TSDF	0.25	---	---	---	---	---	---	1	---	---	---	---	---	---
	RCRA-LQG	0.25	---	---	---	---	---	---	---	1	---	---	1	2	---
	RCRA-SQG	0.10	1	3	1	2	4	5	1	2		1	2	2	---
	RCRA-CESQG	0.10	---	---	---	1	---	---	---	1	1	---	---	---	---
	US ENG CONTROLS	0.10	---	---	---	---	---	---	---	---	---	---	---	---	---
	US INST CONTROLS	0.10	---	---	---	---	---	---	---	---	---	---	---	---	---
	US BROWNFIELDS	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	ERNS	0.10	---	---	---	---	---	2	---	---	---	---	---	---	1
State Databases	SSU	0.25	---	---	---	---	---	1	---	---	---	---	---	---	---
	SRP	0.25	1	1	1	---	5	8	9	2	2	---	4	5	1
	ENG CONTROLS	0.10	---	1	---	---	1	1	1	---	1	---	1	1	---
	INST CONTROL	0.10	---	1	---	---	1	---	1	---	1	---	1	1	---
	LUST	0.10	---	3	3	1	2	5	2	6	---	1	---	3	3
	UST	0.10	1	5	5	8	4	10	1	4	3	6	3	5	3
	MGP	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	SWF/LF	0.25	---	---	---	---	---	1	---	---	---	---	---	---	---
	IL NIPC	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	SPILLS	0.10	---	2	3	1	4	5	2	8	1	1	1	3	2
	DRYCLEANERS	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---

*See Table 1 for database definitions

** '---' = No listings identified

Table 4: Database Listings by Station

Database*		Search Distance From Station (miles)	Station**												
			Jackson	Harrison	Polk	Roosevelt	18th	Blue Island	31st	35th	Pershing	43rd	47th	51st	Garfield
Federal Databases	NPL	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	Delisted NPL Sites	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	CERCLIS	0.25	---	---	---	---	---	---	1	---	---	---	---	---	---
	CERCLIS-NFRAP	0.25	---	---	---	1	---	---	1	1	2	1	---	---	---
	RCRA CORRACTS	0.25	---	---	---	---	---	---	---	1	---	1	---	---	---
	RCRA-TSDF	0.25	---	---	---	---	---	---	---	---	---	1	---	---	---
	RCRA-LQG	0.25	1	1	---	1	---	---	---	---	---	1	---	---	---
	RCRA-SQG	0.10	---	---	1	3	1	1	1	1	---	---	2	1	---
	RCRA-CESQG	0.10	1	---	---	1	1	---	---	---	1	2	---	---	1
	US ENG CONTROLS	0.10	---	---	---	---	---	---	---	---	---	---	---	---	---
	US INST CONTROLS	0.10	---	---	---	---	---	---	---	---	---	---	---	---	---
	US BROWNFIELDS	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	ERNS	0.10	---	---	---	---	---	---	1	---	1	---	---	1	---
State Databases	SSU	0.25	---	---	---	---	---	---	---	---	---	---	---	---	---
	SRP	0.25	1	1	1	1	---	3	5	2	5	2	1	---	---
	ENG CONTROLS	0.10	---	1	---	---	---	---	---	---	1	1	1	---	---
	INST CONTROL	0.10	---	1	---	---	---	---	---	---	1	1	1	---	---
	LUST	0.10	3	2	---	3	1	1	1	4	1	---	2	---	---
	UST	0.10	5	2	1	3	1	7	5	3	1	1	3	1	2
	MGP	0.25	---	---	---	---	---	---	1	---	---	---	---	---	---
	SWF/LF	0.25	---	---	---	---	---	1	---	---	---	---	---	---	---
	IL NIPC	0.25	---	---	---	---	---	---	---	1	1	---	---	---	---
	SPILLS	0.10	2	3	2	5	1	4	3	4	5	6	2	---	---
	DRYCLEANERS	0.25	---	---	---	1	---	---	---	---	---	---	---	---	---

*See Table 1 for database definitions

** '---' = No listings identified

Table 4: Database Listings by Station

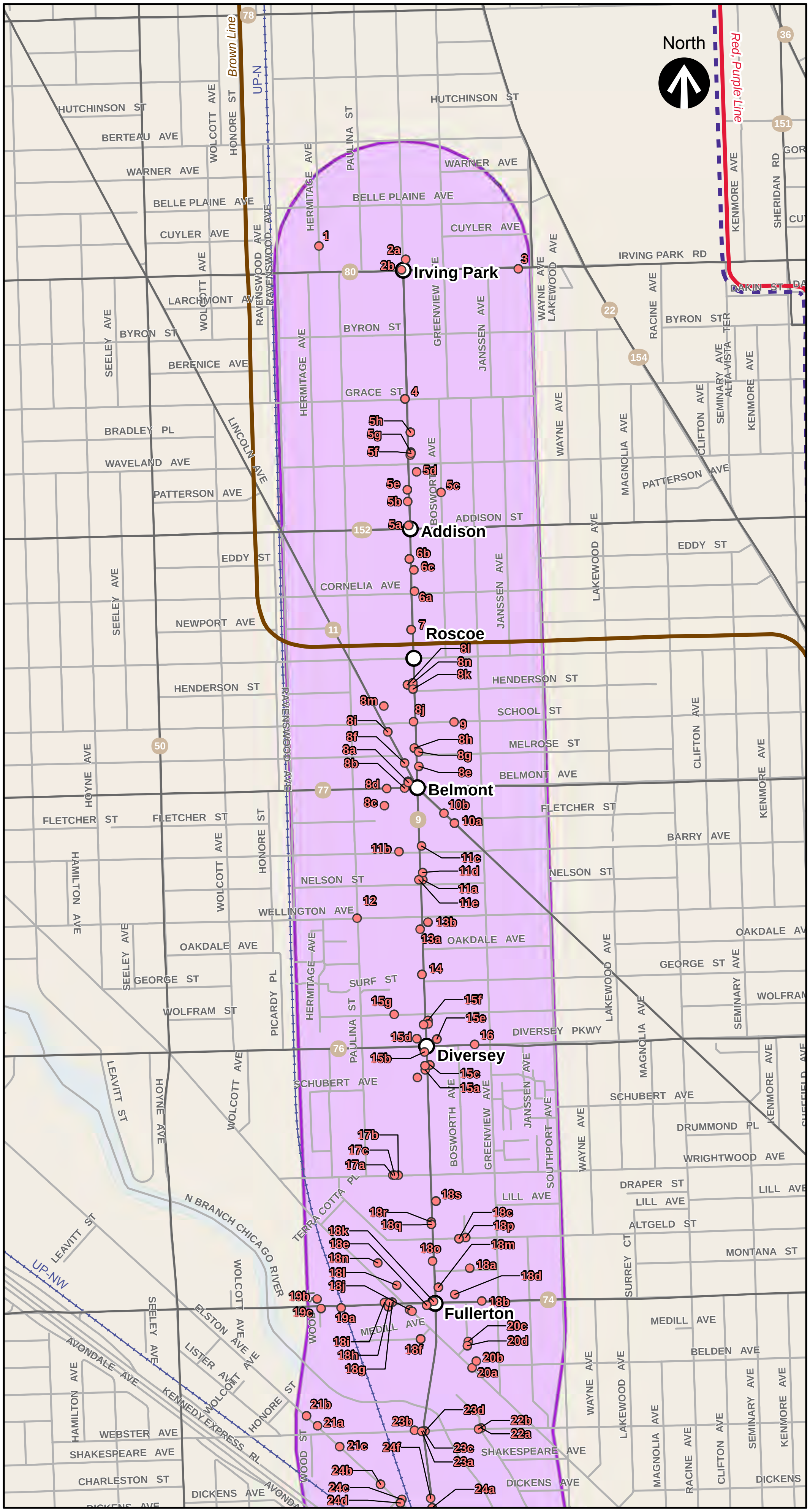
	Database*	Search Distance From Station (miles)	Station**								
			59th	63rd	69th	74th	79th	83rd	87th	91st	95th
Federal Databases	NPL	0.25	---	---	---	---	---	---	---	---	---
	Delisted NPL Sites	0.25	---	---	---	---	---	---	---	---	---
	CERCLIS	0.25	---	---	---	---	---	---	---	---	---
	CERCLIS-NFRAP	0.25	---	---	---	---	---	---	---	---	---
	RCRA CORRACTS	0.25	---	---	---	---	---	---	---	---	---
	RCRA-TSDF	0.25	---	---	---	---	---	---	---	---	---
	RCRA-LQG	0.25	---	---	---	---	---	---	---	---	---
	RCRA-SQG	0.10	---	---	1	1	---	---	2	---	1
	RCRA-CESQG	0.10	1	---	1	---	---	---	---	---	---
	US ENG CONTROLS	0.10	---	---	---	---	---	---	---	---	---
	US INST CONTROLS	0.10	---	---	---	---	---	---	---	---	---
	US BROWNFIELDS	0.25	---	---	---	---	---	---	---	1	---
	ERNS	0.10	---	---	---	---	---	---	---	---	---
State Databases	SSU	0.25	---	---	---	---	---	---	---	---	---
	SRP	0.25	---	1	4	1	1	---	1	---	2
	ENG CONTROLS	0.10	---	---	1	---	---	---	1	---	1
	INST CONTROL	0.10	---	---	1	---	---	---	1	---	---
	LUST	0.10	2	---	1	---	---	1	3	1	2
	UST	0.10	3		3	---	1	---	7	1	3
	MGP	0.25	---	---	---	---	---	---	---	---	---
	SWF/LF	0.25	---	---	---	---	---	---	---	---	---
	IL NIPC	0.25	---	---	---	---	---	---	---	---	---
	SPILLS	0.10	3	---	1	---	---	---	3	1	3
	DRYCLEANERS	0.25	---	---	---	---	---	---	---	---	---

*See Table 1 for database definitions

** '---' = No listings identified

Attachment B

Figures



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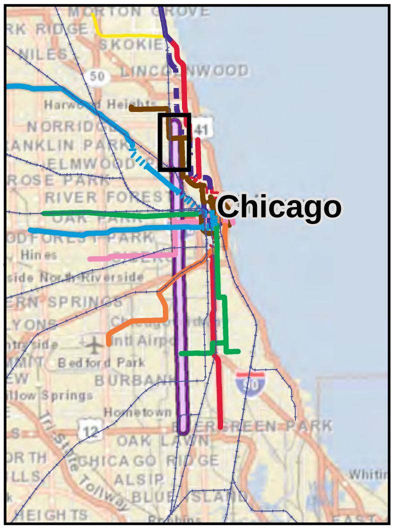


Legend

- ○ Proposed BRT Station
- ● Database Listings
- ▨ Maximum Database Review Search Area
- ▨ Lakes and Rivers
- Metra Commuter Rail

CTA Trains

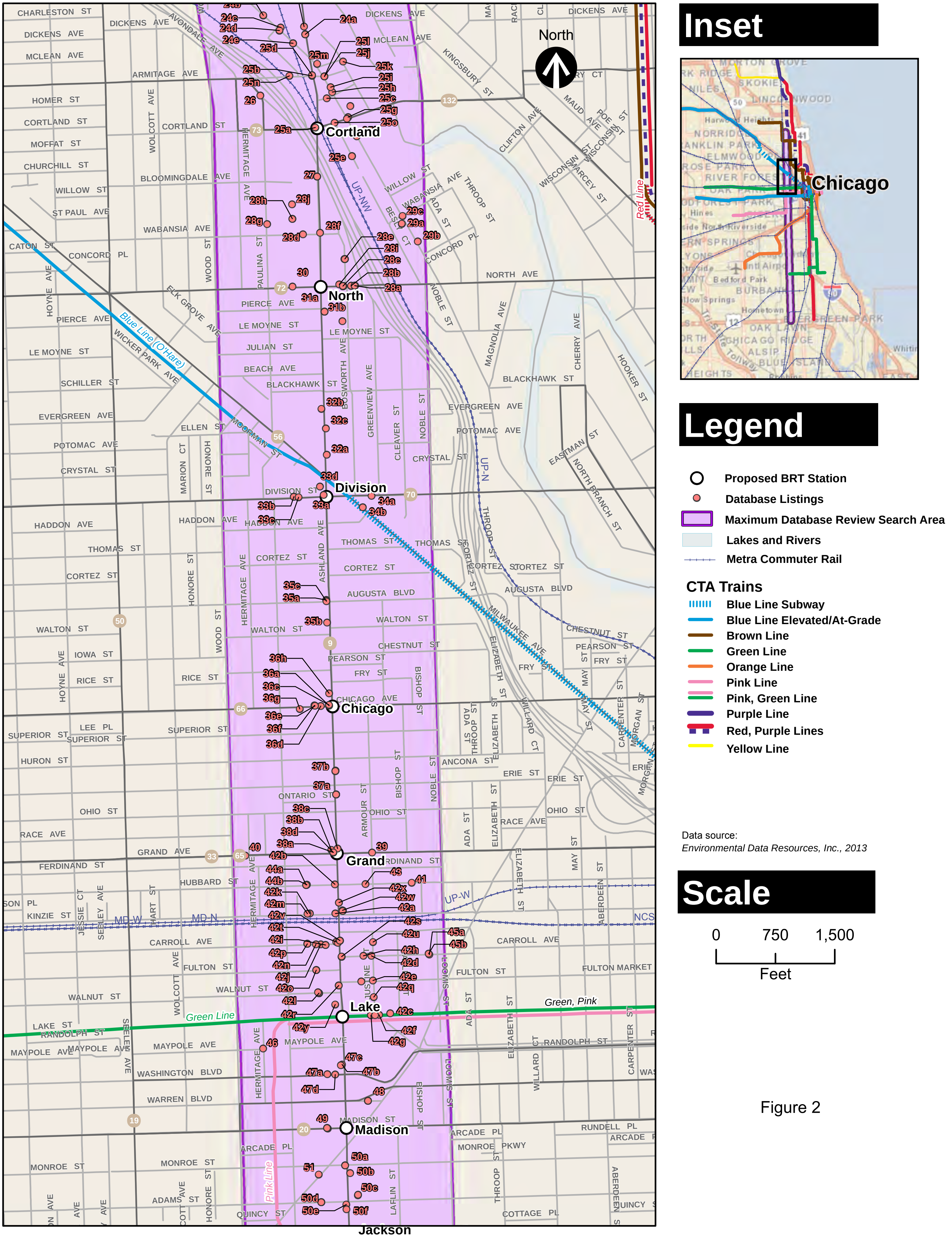
- Blue Line Subway
- Blue Line Elevated/At-Grade
- Brown Line
- Green Line
- Orange Line
- Pink Line
- Pink, Green Line
- Purple Line
- Red, Purple Lines
- Yellow Line

Data source:
Environmental Data Resources, Inc., 2013

Scale

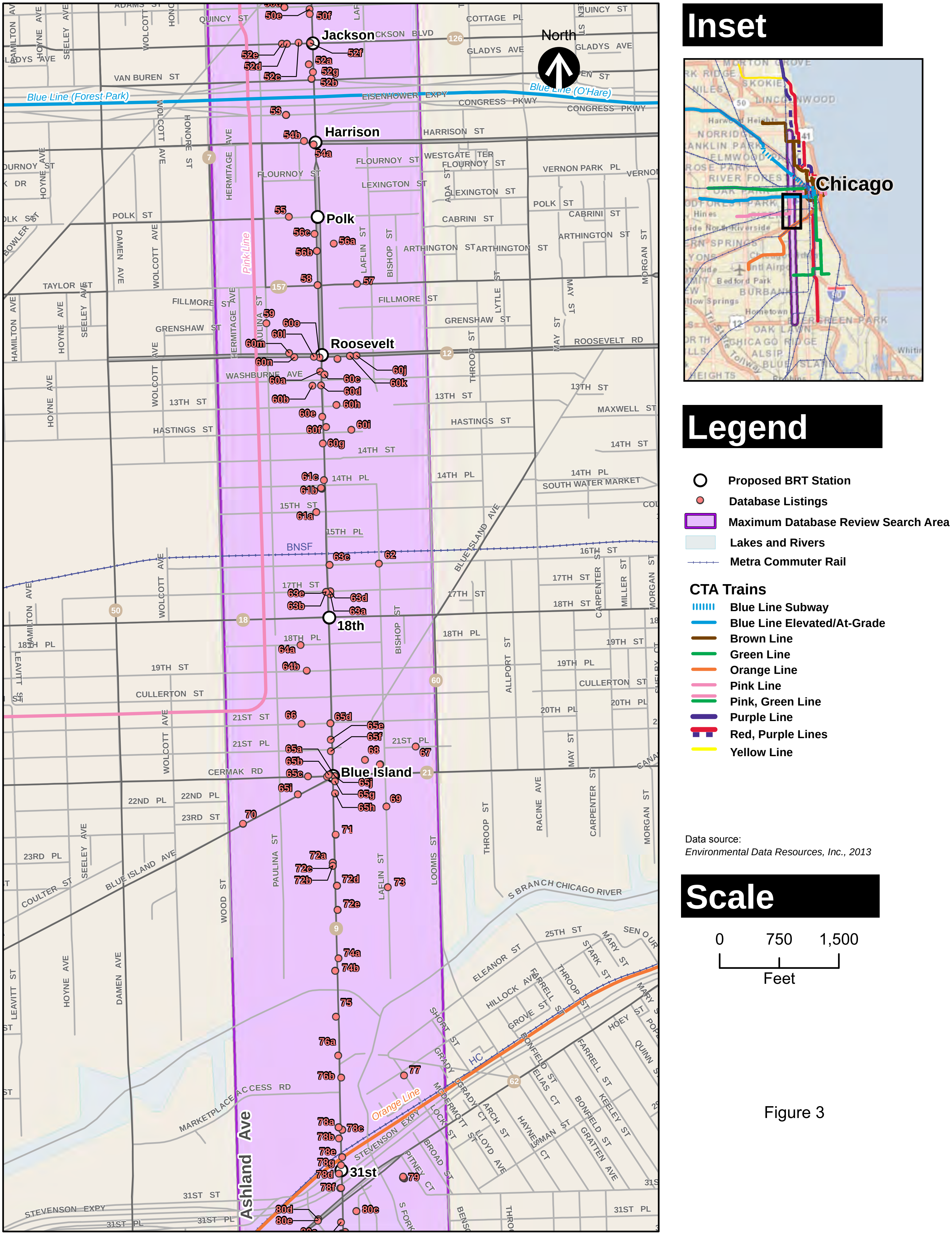
0 750 1,500
Feet

Figure 1



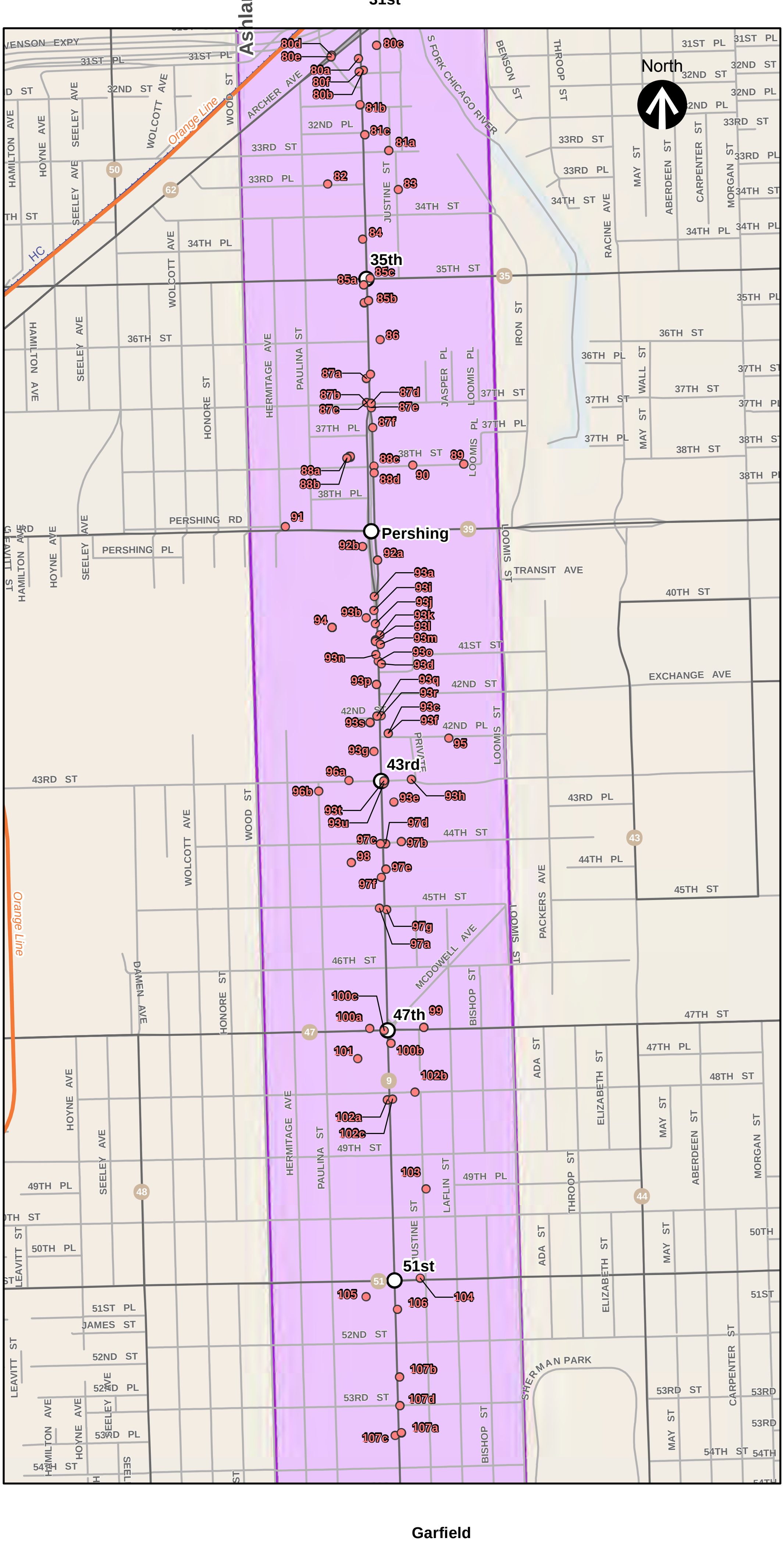
Data source:
Environmental Data Resources, Inc., 2013

Figure 2



Data source:
Environmental Data Resources, Inc., 2013

Figure 3



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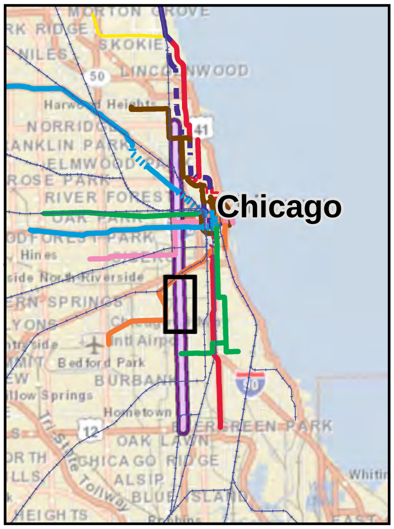


Legend

○ **Proposed BRT Station**

● **Database Listings**

▨ **Maximum Database Review Search Area**

▭ **Lakes and Rivers**

┼┼┼ **Metra Commuter Rail**

CTA Trains

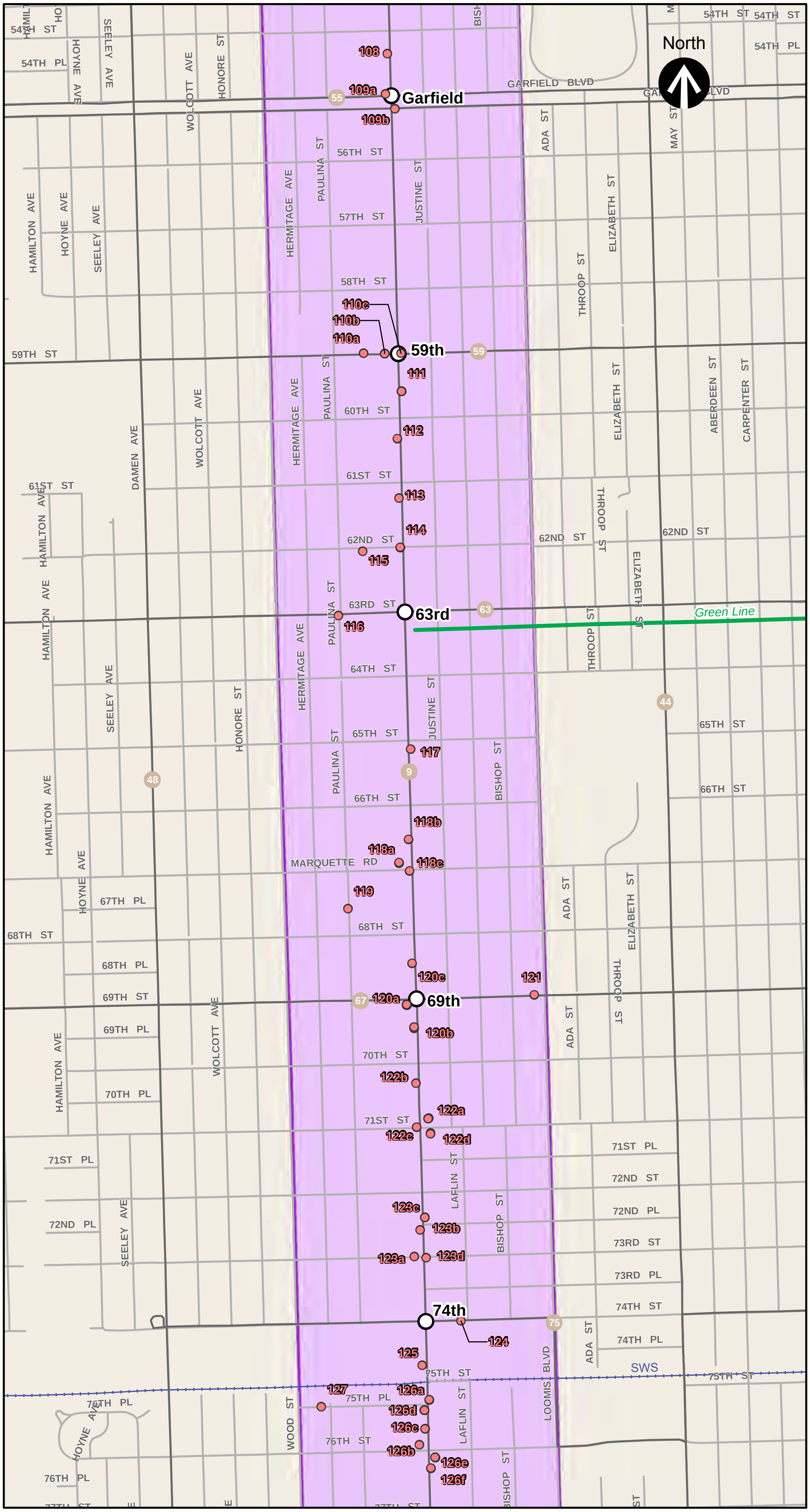
- **Blue Line Subway**
- **Blue Line Elevated/At-Grade**
- **Brown Line**
- **Green Line**
- **Orange Line**
- **Pink Line**
- **Pink, Green Line**
- **Purple Line**
- **Red, Purple Lines**
- **Yellow Line**

Data source:
Environmental Data Resources, Inc., 2013

Scale

0 750 1,500
Feet

Figure 4



Inset

Legend

○ Proposed BRT Station

● Database Listings

▭ Maximum Database Review Search Area

▭ Lakes and Rivers

┼┼┼ Metra Commuter Rail

CTA Trains

||||||| Blue Line Subway

— Blue Line Elevated/At-Grade

— Brown Line

— Green Line

— Orange Line

— Pink Line

— Pink, Green Line

— Purple Line

— Red, Purple Lines

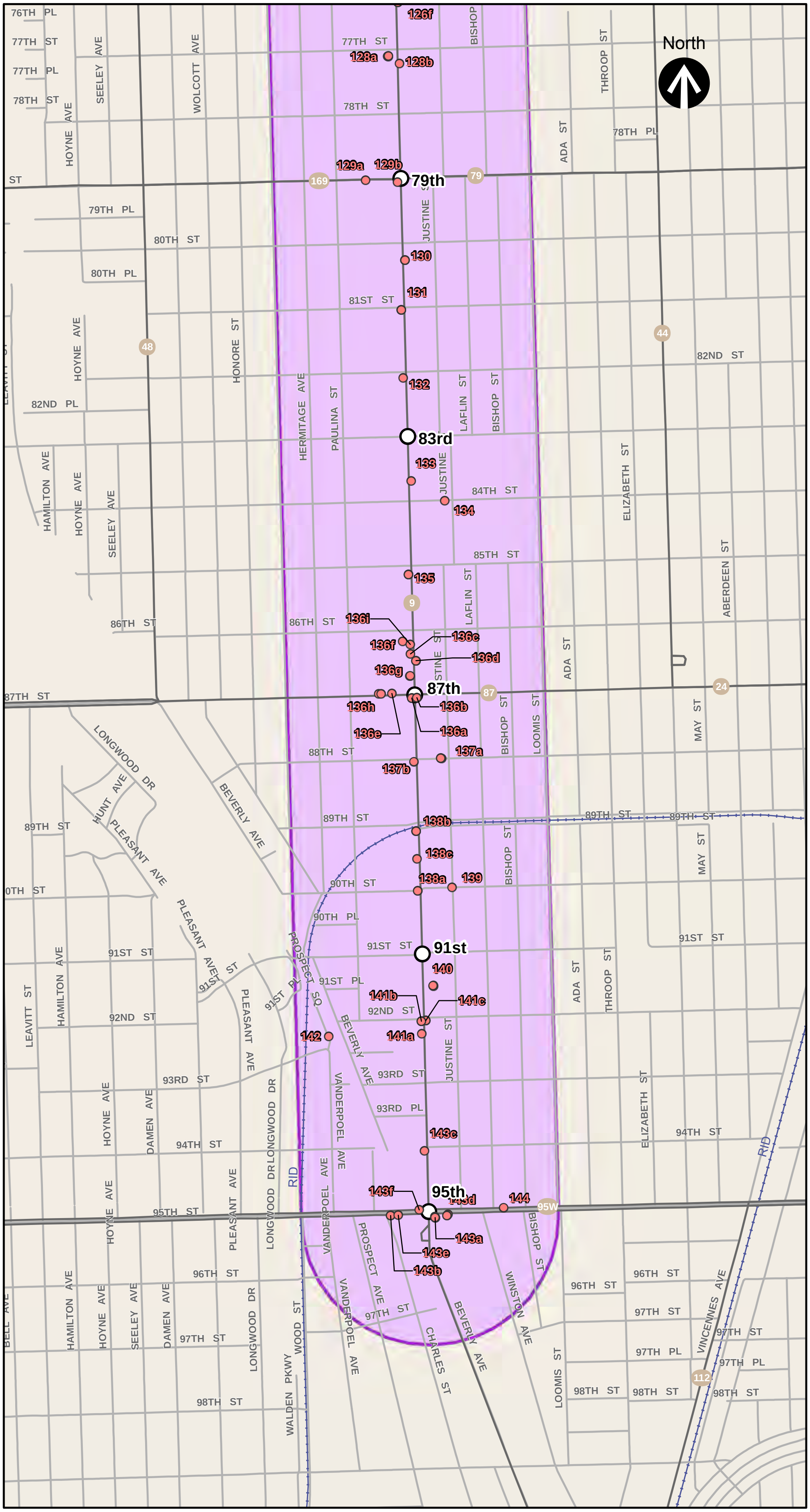
— Yellow Line

Data source:
Environmental Data Resources, Inc., 2013

Scale

0 750 1,500
Feet

Figure 5



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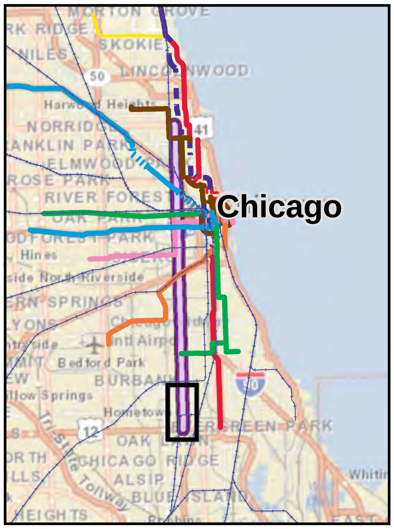


Legend

○ Proposed BRT Station

● Database Listings

▭ Maximum Database Review Search Area

▭ Lakes and Rivers

+−+−+ Metra Commuter Rail

CTA Trains

- Blue Line Subway
- Blue Line Elevated/At-Grade
- Brown Line
- Green Line
- Orange Line
- Pink Line
- Pink, Green Line
- Purple Line
- Red, Purple Lines
- Yellow Line

Data source:
Environmental Data Resources, Inc., 2013

Scale

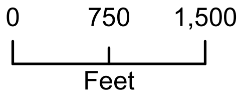


Figure 6

Appendix E-8: Environmental Justice Technical Memorandum

Ashland Avenue
Bus Rapid Transit Project
Environmental Assessment

Memorandum

Date: *August 8, 2013*

Subject: *Environmental Justice*

Prepared by: *CDM Smith, Inc.*

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and the Federal Transit Authority (FTA), is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue Bus Rapid Transit (BRT) Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

- Construction of 35 median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

Purpose

This memorandum analyzes the Ashland Corridor BRT Project's potential for disproportionately high and adverse impacts on low income and minority populations. The analysis was performed in accordance with related federal and Illinois laws and guidance including Title VI of the 1964 Civil Rights Act, Executive Order (EO) 12898, EO 13166, State Bill 2193, and FTA Circulars 4703.1 and 4702.1B as described in Section 1.

Regulatory Framework

The FTA issued updated guidance in August and September 2012 to assist recipients of FTA financial assistance to comply with Environmental Justice and Title VI requirements: Circular 4703.1 *Environmental Justice Policy Guidance for Federal Transit Administration* and Circular 4702.1B *Title VI Requirements and Guidelines for Federal Transit Administration Recipients*. The two FTA circulars provide methods to fulfill the key goals of federal environmental justice policies:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Title VI of the 1964 Civil Rights Act prohibits discrimination on the ground of race, color, or national origin. Title VI imposes a statutory obligation on FTA recipients to: (1) ensure that the level and quality of public transportation service is provided equitably without regard to race, color, or national origin; (2) promote full and fair participation in public transportation decision-making without regard to race, color or national origin; and, (3) ensure meaningful access to transit-related programs and activities by persons with limited English proficiency (LEP). CTA will prepare a separate Title VI analysis for this project.

Executive Order (EO) 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations* was issued by President Clinton on February 4, 1994. It requires each federal agency "to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations". The subsequent memorandum to agency department heads defines environmental justice by requiring that "each federal agency shall analyze the environmental effects, including human health, economic, and social effects, of federal actions including effects on minority and low-income communities, when such analysis is required by NEPA." The memorandum also directs each federal agency to "provide opportunities for community input in the NEPA process, identify potential effects and mitigation measures in consultation with affected communities, and improve the accessibility of meetings, crucial documents, and notices".

On August 11, 2000, President Clinton issued EO 13166, *Improving Access to Services for Persons with Limited English Proficiency (LEP)* to help ensure that all people have access to meaningful communications about and participation in any program or activity receiving federal assistance. It requires federal agencies to examine the services they provide for persons who, as a result of national origin, are not fully proficient with the English language. Agencies must determine whether LEP populations are in need of their services, and develop and implement a system to provide those services such that LEP populations can have meaningful access to them.

The State of Illinois has additional legislative requirements regarding environmental justice. Article XI of the *Constitution of the State of Illinois* (Article XI) establishes the legislative responsibility of the state "to provide and maintain a healthful environment for the benefit of this and future generations" and provides each person with the individual right to a "healthful environment." (Illinois General Assembly, Constitution of the State of Illinois). In furtherance of Article XI, State Bill 2193, referred to as the Environmental Justice Act, was enacted on August 16, 2011 and established the Commission on Environmental Justice (Commission) in Illinois. The Commission is charged with advising state entities on environmental justice issues, reviewing and analyzing current state laws and policies and recommending options to rectify environmental justice concerns. The bill requires that no segment of the population in Illinois, "regardless of race, national origin, age, or income, should bear disproportionately high or adverse effects of environmental pollution." (Illinois General Assembly, Public Act 097-0391).

Methodology

To establish the presence of low income and minority populations, year 2010 census data was analyzed for all census tracts within half mile of the proposed project alignment along Ashland Avenue. Figures 1 and 2 provide maps of minority and low-income populations along the Ashland Avenue BRT corridor. The community area boundaries defined by the City of Chicago typically coincide with geographic features that are more meaningful to residents than census tract boundaries, such as boulevards, freight corridors, highways, and other major divisions between neighborhoods. To avoid artificially diluting or inflating the presence of minority and low-income populations, all census tracts along Ashland Avenue within each affected community area were analyzed to determine whether the community area as a whole contains a predominantly minority or low income population.

Community areas where populations in the census tracts along Ashland Avenue consist of more than 50 percent minorities were classified as predominantly minority communities. Community areas where the percentage of low income families in the census tracts along Ashland Avenue is greater than the city-wide percentage of 17.2 percent were classified as communities with concentrations of low income populations. All community areas containing predominantly minority populations and/or concentrations of low income populations were classified as environmental justice communities. The findings of the other environmental technical memoranda were then analyzed to determine whether impacts and benefits would occur disproportionately in community areas with environmental justice populations. The public outreach process to ensure full and fair participation in the decision-making process by all potentially affected communities is described in Section 6.

Affected Environment

Table 1 presents the summary findings of whether environmental justice populations are present in each community area, and additional detail and demographic data are provided in later in this section. All of the community areas along the Ashland Avenue corridor south of Kinzie Street and the Union Pacific (UP) train tracks have been determined to contain environmental justice populations.

Table 1: Summary of Environmental Justice Populations by Community Area

Census Tracts within 1/2 mile of Alignment organized by Community Area [1]	Concentrations of Minority Populations [2]	Concentrations of Low Income Populations [3]	Summary Finding: Presence of Environmental Justice Populations
North Center	No	No	***No***
Lake View	No	No	***No***
Lincoln Park	No	No	***No***
Logan Square	No	No	***No***
West Town	No	No	***No***
Near West Side	Yes	No	***Yes***
Lower West Side	Yes	Yes	***Yes***
Bridgeport	Yes	Yes	***Yes***
McKinley Park	Yes	No	***Yes***
New City	Yes	Yes	***Yes***
West Englewood	Yes	Yes	***Yes***
Auburn Gresham	Yes	Yes	***Yes***
Washington Heights	Yes	Yes	***Yes***
Beverly	Yes	No	***Yes***

1. Analysis included Census tracts within 1/2 mile of the corridor. They are organized by Community Area. Counts do not represent totals for the entire Community Area, only Census tracts within 1/2 mile of the Project Area.

2. Supporting data provided in Table 3

3. Supporting data provided in Table 6

Minority Populations

FTA defines a minority population as any readily identifiable group or groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed or transient persons such as migrant workers or Native Americans who would be similarly affected by a proposed project. Minority includes persons who are American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, and Native Hawaiian and other Pacific Islander. For the purposes of this analysis, the FTA criteria are satisfied by identifying the areas where the percentage of minority populations exceeds 50 percent. Census data analysis was supplemented by field visits to confirm findings. **Table 2** compares the project area population to the populations of Cook County and the City of Chicago. The project area contains a higher percentage of minority populations than the county as a whole, and a lower percentage than the rest of the City of Chicago.

Table 2: Minority Populations Compared to City and County

	Cook County	Chicago	Project Area
Total (Population)	5,194,675	2,695,598	242,847
Total Minority (Non-White)	2,916,317	1,840,881	151,199
Percent Minority (Non-White)	56.1%	68.3%	62.3%

Source: 2010 Decennial Census (100% data), Data Table: P5 (Hispanic or Latino origin by race)

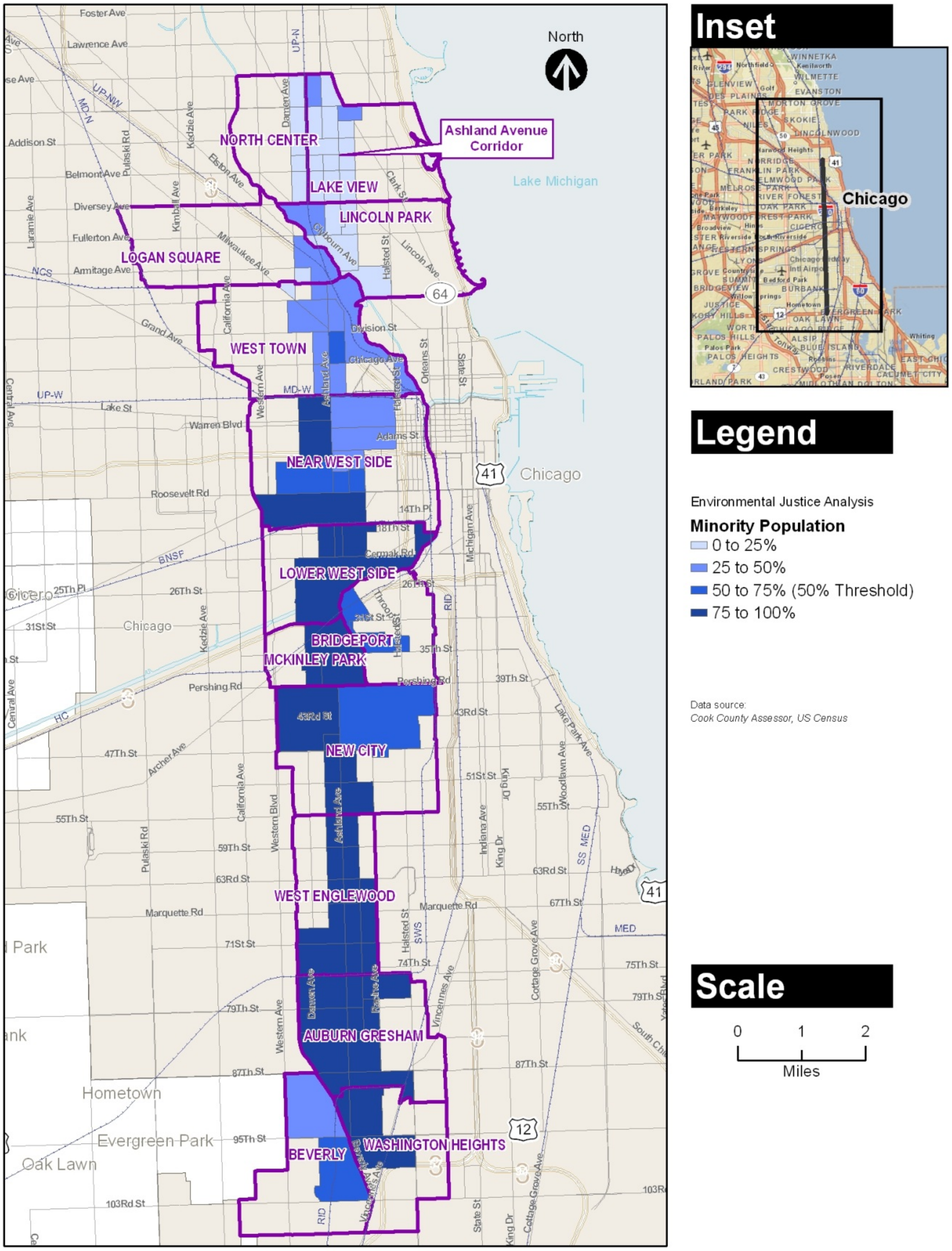
Table 3 shows where predominantly minority populations are present in each of the community areas that the Ashland Avenue corridor traverses. Minority populations are not evenly distributed throughout the project area, and are mostly concentrated in the southern portion of the corridor. **Figure 1** provides a graphical representation of the data presented in **Table 3**.

Table 3: Minority Populations by Community Area

Census Tracts within 1/2 mile of Alignment organized by Community Area [1]	Minority [2]	Population	Percent Minority (Blue cells indicate concentrations)
North Center	1,841	9,978	***18.5%***
Lake View	5,423	31,398	***17.3%***
Lincoln Park	2,901	16,723	***17.3%***
Logan Square	752	3,089	***24.4%***
West Town	10,789	29,328	***36.8%***
Near West Side	12,573	23,240	***54.1%***
Lower West Side	13,151	14,856	***88.5%***
Bridgeport	4,433	6,871	***64.5%***
McKinley Park	8,341	9,990	***83.5%***
New City	19,877	22,568	***88.1%***
West Englewood	22,858	22,951	***99.6%***
Auburn Gresham	33,839	33,918	***99.8%***
Washington Heights	10,580	10,621	***99.6%***
Beverly	3,841	7,316	***52.5%***

1. Analysis included Census tracts within 1/2 mile of the corridor. They are organized by Community Area. Counts do not represent totals for the entire Community Area, only Census tracts within 1/2 mile of the Project Area.
2. Minority Data: 2010 Decennial Census, Data Table P5 (Hispanic or Latino origin by race).

Figure 1: Minority Population



Based on census data, all of the community areas along the Ashland Avenue corridor south of Kinzie Street and the Union Pacific (UP) train tracks have been determined to consist of predominantly minority populations:

- Near West Side
- Lower West Side
- Bridgeport
- McKinley Park
- New City
- West Englewood
- Auburn Gresham
- Washington Heights
- Beverly

Low Income Populations

FTA defines a low income person as one whose median household income is at or below the Department of Health and Human Services (DHHS) poverty guidelines. A low income population is any readily identifiable group of low income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient populations (such as migrant workers or Native Americans) who would be similarly affected by a proposed project. For the purposes of this analysis, the FTA criteria are satisfied by identifying areas where the percentage of households with median income below the DHHS poverty guidelines exceeds the citywide percentage. Census data analysis was supplemented by field visits to confirm findings.

The DHHS poverty guidelines for are shown in **Table 4**. Year 2012 poverty guidelines are adjusted in the table to year 2010 to ensure comparability with year 2010 census data.

Table 4: DHHS 2012 Poverty Guidelines

Persons in Household	2012 Poverty Guideline	Adjusted Poverty Guideline (2010)
1	$11,170	$10,586
2	$15,130	$14,339
3	$19,090	$18,092
4	$23,050	$21,845
5	$27,010	$25,598
6	$30,970	$29,351
7	$34,930	$33,104
8	$38,890	$36,857

Source:
DHHS, 2012 http://aspe.hhs.gov/poverty/12poverty.shtml
BLS, 2012 http://www.bls.gov/data/inflation_calculator.htm

Table 5 compares the project area population to the populations of Cook County and the City of Chicago. The project area contains a substantially higher percentage of low income populations than the county as a whole, and approximately the same percentage as the rest of the City of Chicago.

Table 5: Low Income Populations Compared to City and County

	Cook County	Chicago	Project Area
Total (Families)	1,203,421	581,571	51,436
Total Under Poverty Level	142,774	99,968	8,747
Percent Under Poverty Level	11.86%	17.2%	17.0%

Source: 2010 American Community Survey (5-year estimates), Data Table B17026 (ratio of income to poverty level of families in the past 12 months)

Table 6 shows where concentrations of low income populations are present in each of the community areas that the Ashland Avenue corridor traverses. Low income populations are not evenly distributed throughout the project area, and are mostly concentrated in the southern portion of the corridor. **Figure 2** provides a graphical representation of the data presented in **Table 6**.

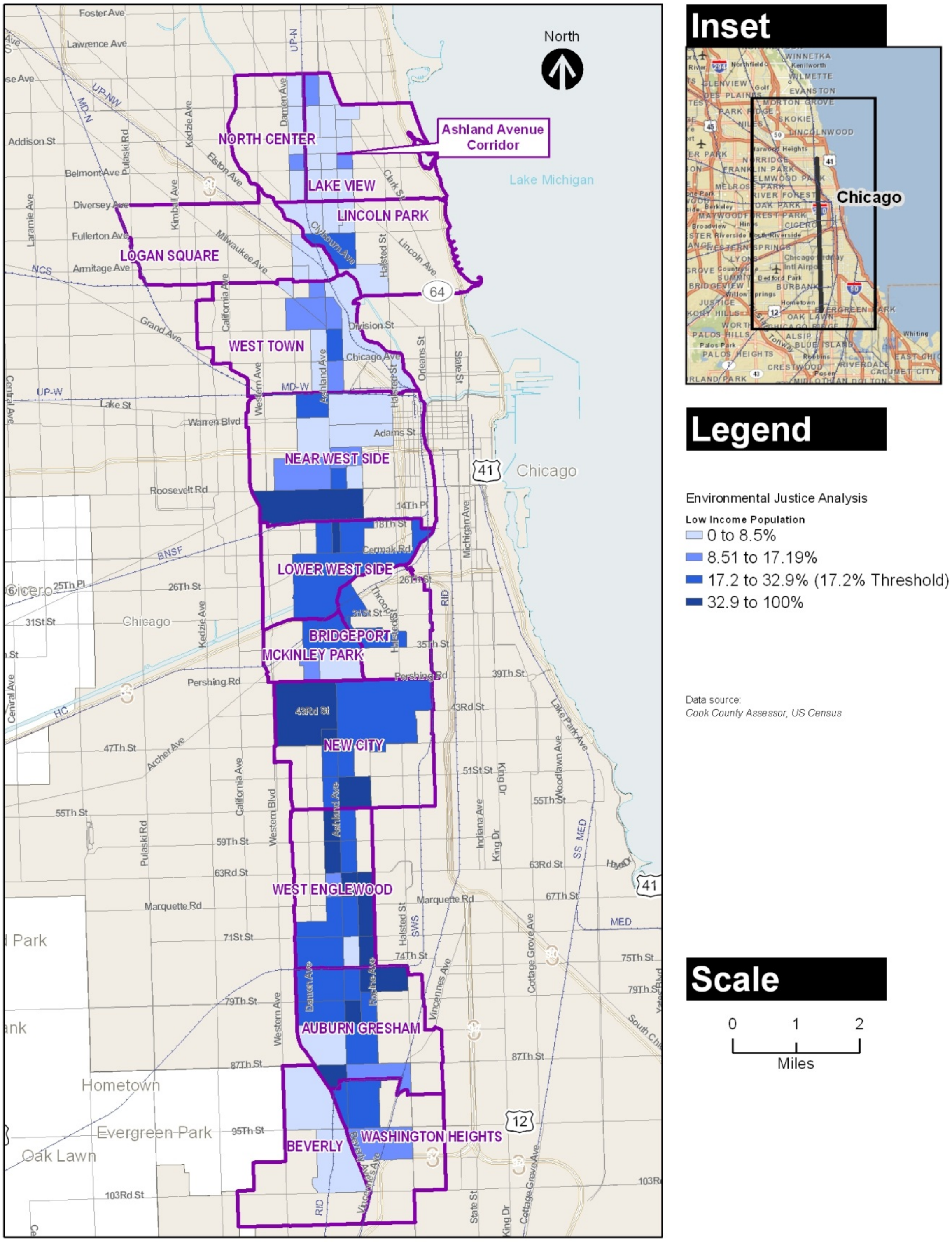
Table 6: Low Income Populations by Community Area

Census Tracts within 1/2 mile of Alignment organized by Community Area [1]	Low-income Families [2]	Families	Percent Low-Income (Blue cells indicate concentrations)
North Center	77	2,404	***3.2%***
Lake View	138	6,114	***2.3%***
Lincoln Park	243	3,210	***7.6%***
Logan Square	-	674	***0.0%***
West Town	471	5,140	***9.2%***
Near West Side	598	3,908	***15.3%***
Lower West Side	723	2,719	***26.6%***
Bridgeport	343	1,519	***22.6%***
McKinley Park	327	2,383	***13.7%***
New City	1,389	4,658	***29.8%***
West Englewood	1,600	5,083	***31.5%***
Auburn Gresham	2,093	8,671	***24.1%***
Washington Heights	656	2,751	***23.8%***
Beverly	89	2,202	***4.0%***

1. Analysis included Census tracts within 1/2 mile of the corridor. They are organized by Community Area. Counts do not represent totals for the entire Community Area, only Census tracts within ½- mile of the Project Area.

2. Low-Income Data: 2010 American Community Survey 5-year estimates, Data Table B17026 (Ratio of income to poverty level of families in the past 12 months).

Figure 2: Low Income Populations



Data source:
Cook County Assessor, US Census

Based on census data, most of the community areas along the Ashland Avenue corridor south of 16th Street and the Burlington Northern Santa Fe (BNSF) train tracks have been determined to contain concentrations of low income populations:

- Lower West Side
- Bridgeport
- New City
- West Englewood
- Auburn Gresham
- Washington Heights

Limited English Proficiency

An initial LEP assessment was completed during 2012 as part of the Alternatives Analysis (AA) process. The AA study area extended beyond, but fully includes, the current area for the proposed project on Ashland Avenue. The AA study area encompassed the Western and Ashland Avenue corridors, spanning from Chicago's northern city limits at Howard Street to 95th Street on the south. The assessment found that the majority of residents within the AA study area speak English "very well" (65.1%). Approximately 24 percent of the total population in the AA study area speak Spanish, but do not speak English "very well." The Spanish-speaking LEP population is spread across the majority of the project area. Chinese and Polish were the only other languages spoken by a significant portion of speakers (5% or greater) who speak English less than "very well," though these LEP populations are present only in isolated locations and not throughout the entire project area.

Many individuals who speak English less than "very well" live in linguistically isolated households. Approximately 10% of households in the AA study area are linguistically isolated, 68% of which speak Spanish.

Project area residents speak a multitude of languages overall. The one prevalent, non-English language spoken throughout the project area, and the most prevalent language spoken in linguistically isolated households, is Spanish. As such, all of the outreach efforts (noticing materials, meetings, signage, etc.) have been conducted in both English and Spanish. Because there are isolated areas of Chinese and Polish-speaking LEP populations in the project area, public notices have included an offer of additional translation services for these languages.

Environmental Impacts and Mitigation

This section describes the potential for disproportionate impacts and unevenness of benefits in the project area's environmental justice communities. As identified in Section 3 all community areas along Ashland Avenue south of Kinzie Street and the UP train tracks have been determined to contain environmental justice populations.

No-Build Alternative

The No-Build Alternative would not have adverse environmental impacts. Therefore, no disproportionately high and adverse impacts would occur to low income or minority populations. However, the No-Build Alternative would lack the benefits of the proposed project, including enhanced mobility, economic development, and livability. Bus travel times along Ashland Avenue would remain lengthy and unreliable, thereby limiting the mobility of riders, many of whom are low income and transit dependent.

Build Alternative

Assuming that all applicable mitigation measures identified in the other environmental memoranda are implemented, there would be no disproportionately high and adverse impacts in low income and minority communities.

The design of the Ashland Avenue BRT Project would be similar throughout the corridor. The BRT facilities would be constructed almost entirely within the existing street right-of-way along Ashland Avenue, and would not require any building displacements. One traffic lane would be removed in each direction to accommodate the addition of bus-only lanes, though parking would be retained on both sides of the street to allow continued automobile access to local businesses. Local bus service would be retained, which would benefit elderly riders and persons with disabilities who may have difficulty walking to the less-closely-spaced BRT stations. The level boarding and ADA-compliant features at BRT stations would also enhance access to transit service for these groups. Left turn lanes would be removed at most intersections, and left turn movements would be restricted. Some traffic is anticipated to divert to other major thoroughfares nearby, and sufficient traffic calming measures would be implemented to address concerns raised about possible cut-through traffic on residential streets and no adverse impacts are expected. Some drivers may also elect to use transit more frequently due to the improved bus service. Additional details about roadway and traffic pattern changes are provided in the Transportation Memorandum. Mobility and access would improve overall due to the enhanced transit capacity and convenience.

Based on the environmental analyses conducted for this EA, there may be some moderate noise increases from additional BRT vehicles (up to12 added BRT buses in peak hours) being added to the corridor, however, no significant noise impacts are anticipated to occur as a result of the Build Alternative. In addition, noise levels are expected to be lower with the re-designation of one vehicular travel lane in each direction to a dedicated bus-only lane. With respect to air quality, this project is not anticipated to be a project of air quality concern, would utilize newer and more efficient buses throughout the corridor to reduce air pollution factors and therefore no impacts are expected. Implementation of the proposed project would provide incentives for more commuters to use the BRT service within the Ashland Avenue corridor. As a result, the number of vehicles spending time in congestion would be reduced and therefore the Build Alternative has the potential to enhance air quality.

Construction activities would be minimal and temporary, and would be similar throughout the corridor. These activities would affect all populations within the corridor, including minority and low-income populations, and would consist of repaving and restriping of lanes, sidewalk improvements, temporary lane and sidewalk closures, and placement of shelters and other station features. Traffic delays would be likely during construction, and detours would be provided to maintain access for motorists, transit riders, and pedestrians. Construction would be staged so as to limit impacts to the surrounding communities. The CTA would keep community members apprised of construction schedules in readily accessible public locations as well as on the CTA website, and seek community input when developing construction plans.

Operation of the Ashland Avenue BRT Project would result in transportation benefits to all populations within project corridor, including minority and low-income populations. Benefits would take the form of faster bus service, new BRT stations, landscape and sidewalk enhancements, and associated quality of life improvements. These physical enhancements would also contribute to potential economic development and livability improvements. The BRT service and street enhancements could incentivize new TOD in the corridor, which would be consistent with zoning. BRT facilities would be designed and sited to complement the existing character of the project area neighborhoods. Improvements at intersections would also help reduce the dividing effect between neighborhoods that Ashland Avenue currently has in some areas.

Since the results of the environmental analyses completed for this EA have not identified any adverse impacts associated with the Ashland Avenue BRT Project, the project is therefore not expected to result in disproportionately high and adverse impacts on minority or low-income populations. Furthermore, the overall effects of the Build Alternative are expected to be beneficial, with these benefits accruing to all populations within the project corridor, including minority and low-income populations. Based on these findings, no additional mitigation measures specific to environmental justice would be needed. Based on the findings of the demographic analysis, specialized outreach to organizations representing minority and low-income populations along the corridor was conducted during the EA process to obtain their input on the project.

Specialized Outreach to Environmental Justice Communities

Throughout the environmental process, CTA has and will continue to prepare and distribute public information materials to update the public on the project, including minority and low income communities. A press release, face sheet, and pamphlet have been developed that provide an overview of the project and the opportunities for public input. This information and other outreach materials are also provided on the project website (www.transitchicago.com/ashlandbrt).   A project e-mail address is available and included on all outreach materials for the public to contact CTA and provide comments. In accordance with the findings of the LEP analysis, all outreach was performed in both English and Spanish, and Chinese and Polish translation services were offered. Sign language interpretation will also be provided at the public hearing to be held for this EA.

After the preferred alternative was announced, CTA undertook both traditional non-traditional outreach methods to help engage minority and low-income communities more fully in the project. Activities included a mobile texting campaign, car cards on buses and in rail stations, and direct mailings to groups who represent minority and low income communities (see **Attachment A** for a list of groups). This variety of media was used to help allow maximum community participation and to ensure clarity of communications. These media will also be used to announce the public hearing. Input received from the public will be evaluated and incorporated into this EA.

References Cited

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Attachment A

Environmental Justice Organizations Mailing List

Ashland Avenue BRT Project Environmental Justice Outreach List

Name	Salutation	First Name	Last Name	Title	Street	City	State	Zip Code	Email #1	Phone Number
The Back of the Yards Neighborhood Council	Mr.	Craig	Chico	President & CEO	1751 W 47th Street	Chicago	IL	60609	cchico@bync.org	(773) 523-4416
Enlace Chicago	Mr.	Michael D.	Rodriguez	Executive Director	2756 S. Harding Avenue	Chicago	IL	60623	mrodriguez@enlacechicago.org	(773) 542-9233
Erie Neighborhood House	Ms.	Celena	Roldán	Executive Director	1347 W. Erie Street	Chicago	IL	60642	croldan@eriehouse.org	(312) 666-3430
Greater Southwest Development Corporation	Mr.	Ghian	Foreman	Executive Director	2601 W. 63rd Street	Chicago	IL	60629	g.foreman@greatersouthwest.org	(773) 436-1000
Latino Policy Forum	Ms.	Sylvia	Puente	Executive Director	180 North Michigan Avenue, Suite 1250	Chicago	IL	60601	spuente@latinopolicyforum.org	(312) 376-1766
Pilsen Alliance	Mr.	Nelson	Soza	Executive Director	1831 S. Racine, 3rd Floor	Chicago	IL	60608	pilsenalliance@thepilsenalliance.org	(312) 243-5440
Pilsen Neighbors Community Council	Mr.	Juan F.	Soto	Executive Director	2026 S. Blue Island Avenue	Chicago	IL	60608	jfsoto@gamaliel.org	(312) 666-2663
The Resurrection Project	Mr.	Raul	Raymundo	Chief Executive Officer	1818 S. Paulina Street	Chicago	IL	60608	rraymundo@resurrectionproject.org	(312) 666-1323
Southwest Organizing Project	Mr.	Jeff	Bartow	Executive Director/Lead Organizer	2609 West 63rd Street, Second Floor	Chicago	IL	60629	jeffbartow@sbcglobal.net	(773) 471-8208
Beverly Improvement Association	Mr.	James	McAloon	President	28 E Jackson Blvd Suite 1102	Chicago	IL	60604	communications@thebia.org	
Teamwork Englewood	Ms.	Juandalyn	Holland	Executive Director	815 W. 63rd Street	Chicago	IL	60621	jholland@teamworkenglewood.org	(773) 488-6600
Imagine Englewood If	Ms.	Jean	Carter-Hill	Executive Director	730 W. 69th Street	Chicago	IL	60621	jhill705@sbcglobal.net	(773) 488-6704

Appendix F-1: Section 106 Coordination

Section 106 Meeting Materials

MEETING NOTES

RE: Section 106 Eligibility and Effects Meeting

DATE: July 15, 2013

CHAIRPERSON: Joseph Iacobucci, CTA

LOCATION: CTA

TO: Distribution and All Attendees

ATTENDEES:

Name		***Initials***	***Organization / Title***
Joseph	Iacobucci	JI	CTA
Mark	Assam	MA	FTA
Robert	Ball	RB	CDM Smith
Steve	Goodreau	SG	CDM Smith
Abby	Mazza	AM	CDM Smith
John	Metille	JM	CDM Smith
Jenifer	Palmer	JP	CDM Smith
Rebecca	Thompson	RT	CDM Smith
Amy	Keller	AK	Chicago Art Deco Society
Benet	Haller	BH	City of Chicago - DHED
Terry	Tatum	TT	City of Chicago- Historic Preservation
Ghian	Foreman	GF	Greater Southwest Development Corp
David	Halpin	DH	Illinois Historic Preservation Agency
Lisa	DiChiera	LD	Landmarks Illinois

PREPARED BY: Jenifer Palmer, AICP – CDM Smith

ISSUE DATE: July 22, 2013

Meeting called to order at 10:00 a.m.

Objective: Section 106 Consultation and Project Briefing

Handouts: Meeting Agenda, Cultural Resources Draft Memorandum

Meeting Notes

1. **Overview of Section 106 Consultation**
   1.1. JI provided introductions and agenda of items to be reviewed today.

1.2. RB provided a general overview of the Section 106 process and requirements. Section 106 includes a four-step process grounded in stakeholder input and involvement to identify and address any potentially adverse effects of a project. RB also went over standard definitions used in the Section 106 process.

    1.2.1. Attendees were asked whether there were any questions concerning the Section 106 process. No questions arose.

2. Project Vision

2.1. JI provided the project overview, contextual background of the project, status of the project today, and next steps.

2.2. JI noted that this project is now approximately one and half years into the planning process. An Alternatives Analysis was conducted last year, and a Preferred Alternative of center running BRT was chosen to move forward. Now the project is in the NEPA environmental and conceptual engineering phase.

2.3. JI provided some background information along the corridor, including information on bus and automobile speeds, identifying areas in the corridor that are industrial corridors, and describing the high transit mode split in the corridor.

    2.3.1. About half of the people today already take the train or bus and commute times are slow, especially on transit.

    2.3.2. In addition, safety is a major concern as the project moves forward. Given the high pedestrian volumes, crashes are disproportionately high. The conceptual design is investigating ways of addressing this concern.

2.4. JI went through the four major alternatives that were investigated through the Alternatives Analysis Process and the two-screening level process that was undertaken to identify this Ashland Avenue BRT Project Preferred Alternative. These included different designs for both curbside and center running BRT.

    2.4.1. JI noted that a lot of outreach was done in 2012 as part of this process. In total, six public meetings were held in identifying the Preferred Alternative.

2.5. CTA and the Chicago Department of Transportation (CDOT) have now adopted the project vision for the 16 mile corridor - center running BRT with stations in the middle at intersections, removing a lane of traffic in both directions. The project is now in concept design to refine this vision. Phase 1 limits for the project have been identified between Cortland and 31st Street (5.4 miles).

    2.5.1.The concept vision will focus on the Phase 1 limits but conceptual plans are being developed for the entire 16-mile corridor.

2.6. Because of the vision for this project, most impacts for project are expected to be related to traffic. A lot of traffic work is currently being done to make sure there is sufficient analysis to help make decisions. Counts have been taken at every signalized intersection along the corridor. In addition, regional model analysis has determined that nearly 1/3 of existing traffic would be diverted to other parallel roadways and the analysis includes looking at potential impacts to these other roadways as well.

    - 2.6.1. CTA is coordinating with CDOT as a project partner, as well as the Illinois Department of Transportation (IDOT), the Mayor's Office for People with Disabilities, and other stakeholders through this phase of project development.
- 2.7. As CTA finalizes NEPA environmental analysis and conceptual design, public meetings are expected to occur in late August. JI noted that as the concept plans are finalized, they will be approximately 20-30% of final design plans. These concepts are not final and CTA and CDOT will continue to coordinate and involve stakeholders as concepts are refined in subsequent phases.
- 2.8. JI showed the BRT video for attendees. Attendees by phone were provided a link to view the video.
    - 2.8.1. JI noted that BRT will create a rail like experience and understanding the impacts is important as we go through this process. Parking and traffic, with one lane being removed in each direction are keys to this analysis.
    - 2.8.2. In addition, removal of left turns will be worked through in final design to ensure access to interstates and other roadways. There are many areas where the street grid is robust and continuous and where turn movement restrictions can be accommodated without impacting the ability for traffic to re-route.
    - 2.8.3. JI also showed a station rendering to attendees. Stations will include a sloped sidewalk entrance for pedestrians and customers to access stations with a crosswalk at signalized intersections. The platform will be approximately 12 to 14 feet in width and about 120 feet in length. This is enough to accommodate two articulated buses. Benches and other amenities will be provided at all stations. Concept design is mainly looking at geometric considerations and station amenity specifics will be refined in final design.
- 2.9. JI concluded and asked attendees if they had any questions about the project and project vision. No questions were asked.

3. **Analysis Methodology**
    - 3.1. RB provided an overview on the cultural resources analysis methodology, noting that it is based on limited impacts associated with constructing the project within existing right of way.
        - 3.1.1. As such, the Area of Potential Effect (APE) for the corridor has been confined to within current right of way. Limited actions will occur within the right of way, primarily consisting of milling and repaving, and therefore would not affect surrounding historic resources.
        - 3.1.2. Around stations, the APE was expanded; although around stations the project will not demolish any historic resources, the APE was expanded to understand any indirect effects to visual or other resources. The APE was expanded on a station by station basis to ensure a context sensitive approach.
    - 3.2. Once APE was established, a methodology was developed to evaluate potential impacts. Archived data was reviewed from a number of sources. Including the City of Chicago, the State Historic Preservation Officer (SHPO), and various databases on known, documented or national register historic sites.

3.3. Field visits were conducted at all 35 station locations. These sites were photographed and documented, as referenced in Appendix B of the Effects Technical Memorandum. Only resources that were recommended eligible were then included in the technical memorandum.

4. Presentation of Identified National Register of Historic Places (NRHP) Sites within APE

4.1. RB asked attendees if they had had a chance to review the technical memorandum and if they had any questions about identified resources within the APE.

4.2. AK and LD noted that they are very concerned about Ashland Bridge and whether it is included in the analysis. They believe this site to be eligible.

4.2.1. MA asked for specifics on the location of this bridge. AK and LD noted this bridge is located north of Webster along the north branch of Chicago. RB clarified that this locations is north of the Phase 1 area.

4.2.2. RB answered that there is no station location proposed in that area. The APE for the corridor only reviewed impacts within the right of way, however this could be included. No impacts would be anticipated given the limited construction that would be conducted where stations are not planned.

4.2.3. LD and AK provided further information on deteriorating conditions of the bridge. There are some railing and other limestone work incorporated into the bridge that are of historic concern. They further noted this is the only remaining bridge designed by the Art Deco architect Del Campo. Del Campo also designed the Ogden Avenue Bridge, which was demolished. While the bridge is not on a designated list, they would like to make sure the bridge is considered as improvements are made. If any upgrades could be provided as part of the project work, they requested this be considered. LD will send out website information to attendees for additional information on the bridge.

4.2.4. TT of the City of Chicago noted that they will take a closer look at the proposed route to note whether any additional properties to consider need to be brought to the project team's attention.

4.3. RB asked if there were any other questions on the APE. He asked if LD or AK had any concerns about the bridge along the south branch and they noted they did not have any comments on that bridge.

4.4. BH noted that development and policies along the corridor are being reviewed by the Chicago Department of Economic Development and Housing (DHED) as they relate to existing buildings. Given the pedestrian enhancements anticipated to result from the project, future development is expected to be more compatible with the traditional and 1920s styles of many buildings in area.

4.5. RB continued to note historic resources identified based on the conducted field investigations. He noted that on page 4 of the technical memorandum, there are four historic districts touched by the APE. In addition, 24 structures are listed or recommended as eligible buildings. RB asked if anyone had questions on those identified resources.

4.5.1. TT stated that City of Chicago had no comments at this point. They will further review the corridor to look at the broader picture and to make sure that there are no additions to identified sites that need to be included. He will provide this information within the requested comment period.

4.5.2. AK does not believe that there are any other resources located near the corridor of concern. She noted that they have done a comprehensive survey of Art Deco buildings. She will further review this survey information and let the project team know if there are any additions.

5. **Analysis of Effects at Stations**

5.1. RB provided an overview of effects at stations. He noted that most stations would be in the center median. There may be some smaller instances where, for geometric reasons, stations could need to be located curbside. As such, the analysis looked at both potential station location options.

5.1.1. Based on the analysis, RB noted that there would be no direct effects or relocations needed to accommodate stations regardless of location.

5.1.2. Indirect effects, including noise, vibration, and visual impacts were reviewed as well. The proposed project would follow the current bus route and no new elements would be introduced that are anticipated to impact noise or vibration. From a visual impacts perspective, based on the station design and the reason for the determination of eligible resources, the project team found no adverse visual impacts either. RB noted that Appendix B of the technical memorandum provides greater information on each resource identified and the effects determination.

5.2. AK asked whether the project team assessed construction impacts and whether any adverse effects were noted. RB answered that the proposed construction consists of standard activities within the right of way and any bus shelter on the curbside would be similar in type and size as existing bus stops. In addition, the station itself would be a transparent object. As such, no adverse effects were noted.

6. **Wrap Up and Next Steps**

6.1. RB and AM confirmed that the deadline for providing comments is 30 days from the initial invitation, making the deadline August 2nd.

6.2. RB stated that based on discussions as part of this meeting and written comments received during the comment period, the project team will then finalize the report and send it out to attendees.

6.3. If there are any questions in the meantime, RB asked that attendees please reach out to the project team. The project team wants to make sure attendees have everything they need as comments are made and this will help the project team in the process.

6.4. RB thanked everyone for their participation and asked if there were any final questions.

6.4.1. DH noted that Garfield Boulevard is historic and to make sure the analysis ensures no impacts there. RB noted that the project team would review this and note any secondary/indirect impacts.

CDM Smith

cta

PROJECT: Ashland Avenue BRT
MEETING: Section 106 Consulting Parties Meeting
DATE: July 15, 2013
LOCATION: CTA, 9th Floor, Conference Room C

Name	Organization	Email Address	Phone Number	Present at CTA (Initial)	Present via Phone (circle "Yes")
JENIFER PALMER	CDM Smith	palmerjs@cdmsmith.com	✓	✓	Yes
Mark Assam	FTA	mark.assam@dot.gov	312 353-4070	M.A.	Yes
Abby Mazza	CDM Smith	mazzaam@cdmsmith.com	312 780 7789	AM	Yes
Rebecca Thompson	CDM Smith				[✓ Yes]
David Halpin	IHPA				[✓ Yes]
Gaian Foreman	GSDC	g.foreman@greatersouthwest.org	773.362.3374	✓	Yes
Amy Keller	Chicago Art Deco Socy	aek@wexlerwallace.com	734.812.3176		Yes
Beret Haller	DHED	CBHALLER@CITYOFCHICAGO.ORG	(312) 744-2850	✓	Yes
TERRY TATUM	DHED - HIST PRES	TTATUM@CITYOFCHICAGO.ORG			[✓ Yes]
Lisa Dichiera	Landmarks Illinois				[✓ Yes]
John Mettille	CDM Smith				[✓ Yes]
Steve Goudreau	CDM Smith				[✓ Yes]
					[✓ Yes]
					Yes
					Yes
					Yes
					Yes
					Yes
					Yes
					Yes
					Yes
					Yes
					Yes

Comments from Section 106 Consulting Parties

Illinois Historic
Preservation Agency

FAX 217/782-8161
1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

Cook County
Chicago
Ashland Ave. between Irving Park Road and 95th St.

PLEASE REFER TO: IHPA LOG #012030513

CTA, FTA
Ashland Avenue Corridor Bus Rapid Transit Project

July 18, 2013

Joe Iacobucci
Chicago Transit Authority
567 W. Lake St., 10th Floor
Chicago, IL 60661-1465

Dear Mr. Iacobucci:

Thank you for requesting comments from our office concerning the possible effects of the referenced project on cultural resources. Our comments are required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

Our staff has reviewed the specifications and assessed the impact of the project as submitted by your office. We have determined, with the following conditions, that this project, as proposed, will have no adverse effect on any Historic Properties.

1. Please provide plans and specifications for bus stops located within National Register Historic Districts and for those that are adjacent to historic properties.

2. We would also like to review any proposed changes to street or sidewalk configurations within historic districts.

3. Provide plans and specifications for the treatment of the North Ashland Avenue Bridge, a "Bascule" bridge constructed in 1936. Please note that Bascule bridges are included among the 2013 Ten Most Endangered Historic Places identified by Landmarks Illinois, and this Art Deco Style bridge is eligible for nomination to the National Register of Historic Places.

If you have questions, please contact David J. Halpin, Cultural Resources Manager, at 217-785-4998.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer
AEH

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation

LANDMARKS ILLINOIS
FOUNDED IN 1971

August 2, 2013

Mr. Joseph Iacobucci, Manager
Strategic Planning and Policy
Chicago Transit Authority
567 W. Lake St., 10th Floor
Chicago, IL 60661

RE: CTA Ashland Avenue Corridor Bus Rapid Transit Project

Dear Mr. Iacobucci,

Thank you for inviting Landmarks Illinois to participate in the Section 106 process for the review of CTA's proposed plans for the Ashland Avenue Corridor Bus Rapid Transit Project. As requested at the July 15th consulting parties meeting, we have the following comments:

- We are pleased to see that the project will not have any physical impact on buildings listed in the National Register or determined eligible for listing in the National Register.
- We would like to see expansion of the APE to include the North Ashland Avenue Bridge, which we believe will meet the criteria necessary to be determined eligible for listing in the National Register. This bascule bridge was built in 1936, designed by noted architect and engineer Scippione Del Campo, and is currently part of a thematic listing of Chicago's historic bascule bridges on our *Ten Most Endangered Historic Places* list. It has numerous repair needs and has been in a deteriorated state for many years. Due to its close proximity to the project area, we would like to see consideration made by CTA to include some repairs to the bridge area that connect to the project scope as part of the infrastructure improvements planned for the Ashland BRT. We think this connectivity will help enhance the project overall and bring focus to the repair needs of the bridge.

Thank you for the opportunity to review the Ashland BRT project. Please let me know if we can be of further assistance before the next consultation.

Sincerely,

Lisa DiChiera

Lisa DiChiera
Director of Advocacy

cc: Anne Haaker, IHPA
Dave Halpin, IHPA
Benet Haller, City of Chicago, HED
Terry Tatum, City of Chicago, HED, Historic Preservation Division
Amy Keller, Chicago Art Deco Society

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The Monadnock Building
53 W. Jackson Blvd., Suite 1315
Chicago, Illinois 60604-3562
Tel: (312) 922-1742
www.Landmarks.org

From: Tatum, Terry

E-mail Sent: Tuesday, July 23, 2013 02:59 PM

To: Iacobucci, Joseph

Subject: Ashland BRT - Section 106 consultation comments

Dear Mr. Iacobucci:

Thank you for the opportunity to comment on historic resource identification efforts for the Ashland BRT project as part of the ongoing Section 106 consultation process for this project. Our office appreciates the importance of this undertaking, and we commend the CTA's efforts to incorporate historic preservation issues and concerns into its larger planning efforts.

As part of the Section 106 consultation process, we wish to bring to your attention both general observations on this historic resource identification effort, as well as comments on specific properties that may be impacted by the project.

Chicago Historic Resources Survey red- and orange-rated properties

With the help of your consultant team, you have preliminarily identified properties that are eligible for National Register of Historic Places listing. These properties have been listed in the draft historic resources memorandum, dated June 24, 2013, prepared by CDM Smith, Inc.

Your historic resources consultants have noted when these potentially National Register-eligible properties are designated Chicago Landmarks or are red- or orange-rated properties in the Chicago Historic Resouces Survey. Our office believes that there should be a separate category and listing in the final historic resources memorandum for all properties rated as "red" or “orange” on the Chicago Historic Resources Survey, regardless of whether they subsequently are determined to be National Register-eligible.

Conducted between 1983 and 1995, the Chicago Historic Resouces Survey was a city-wide survey that identified properties constructed prior to 1940 that were perceived to have, within at least the context of their neighborhoods, some historic significance to these neighborhoods. These buildings were either color-coded red or orange, depending upon the level of their historical and architectural significance as known at the time of the survey.

Although not designated Chicago Landmarks, these CHRS “red” and “orange”-rated properties are covered by the City’s Demolition-Delay Ordinance, enacted by City Council in 2003, which allows for an up-to-90-day hold on building permit applications for demolition by the Department of Housing and Economic Development (DHED) for these properties. (More information on this ordinance can be found at http://www.cityofchicago.org/city/en/depts/dcd/supp_info/demolition_delay.html.). Regardless of whether such properties have also been determined eligible for National Register listing, we believe that it is prudent of the CTA to separately identify all CHRS orange-rated properties within the Ashland BRT APE in the historic resources memorandum. The effect of the Ashland BRT project on these properties can then be determined and, if necessary, mitigated through direct discussions with DHED as early in the project as possible.

The following is a list of CHRS "orange" rated properties that were not included in the draft historic resources memorandum as determined eligible for National Register listing. They should be evaluated for National Register eligibility if they haven't already been evaluated. I am grouping these properties by the intersections where BRT stations are planned. Because the draft memorandum did not include maps of all of these intersections, it is possible that some of these properties may fall outside the APE.

Belmont & Lincoln

- 3149-61 N. Lincoln Ave. - two- and six-story commercial building
- 1541-47 W. Belmont Ave. / 3165-67 N. Lincoln Ave. - four-story commecial building
- 3200-06 N. Lincoln Ave. / 1600-08 W. Belmont Ave. - two-story commercial building
- 3223-25 N. Ashland Ave. - two-story commercial building

Division & Milwaukee

- 1184 N. Milwaukee Ave. / 1535-37 W. Division St. - four-story commercial building
- 1201-03 N. Milwaukee Ave. / 1530-34 W. Division St. - two-story commercial building
- 127 N. Milwaukee Ave. - two-story commercial building
- 1210-20 N. Ashland Ave. / 1224-30 N. Milwaukee Ave. - two-story commercial building

Chicago

- Goldbatt Brothers Department Store, 1613-1635 W. Chicago Ave. (designated Chicago Landmark; also CHRS orange) - Chicago Landmark designation report attached
- 1553 W. Chicago Ave. - two-story commercial/residential building

Jackson

- 234 S. Ashland - three-story residential building with one-story front commercial addition - note that 236 and 238 S. Ashland, part of this row, were preliminarily determined eligible for NR listing.

18th St.

- 1718 S. Ashland - three-story commercial / residential building
- 1722-24 S. Ashland - four-story commercial / residential building
- 1804 S. Ashland - four-story commercial / residential building
- 1815 S. Ashland - three-and-a-half-story residential building
- 1820 S. Ashland - four-story commercial / residential building

35th St.

- 3538 S. Ashland - one-story brick garage

79th St.

- 7901 S. Ashland - 3-story commercial building

91st St.

- 9101-09 S. Ashland - 3-story commercial / residential building

In addition, we wish to support the request of Landmarks Illinois and the Chicago Art Deco Society that the Ashland Avenue bridge, a CHRS-orange rated structure that crosses the North Branch of the Chicago River between N. Clybourn and W. Webster, be evaluated for National Register eligibility and included in the final historic resources memorandum. The project APE includes the bridge roadway. It seems reasonable and prudent to our office to evaluate the bridge for NR listing and to include the bridge in the historic resources memorandum.

Again, regardless of the outcome of these National Register eligibility evaluations, we recommend that all CHRS orange-rated properties in the project APE be listed as such in the final historic resources memorandum.

Chicago Park Boulevard System Historic District - determined eligible for National Register listing

Lastly, the Chicago Park Boulevard System Historic District, which includes the City's historic park boulevards and historic buildings facing them, has been determined eligible for National Register listing by the National Park Service, pending final revisions of the nomination. The following buildings at or near the intersection of Garfield Blvd. and Ashland Ave. (the planned location of a BRT station) have preliminarily been determined contributing to the district:

- 1544 W. Garfield Blvd. - two-flat
- 1546 W. Garfield Blvd. - two-flat
- 1601-05 W. Garfield Blvd. - three-story commercial / residential building
- 1607-09 W. Garfield Blvd. - two-flat
- 1614 W. Garfield Blvd. - one-story commercial building

I would be pleased to assist the CTA's consultant team as they gather additional information on historic resources within the APE for this project.

Sincerely,

Terry

Terry Tatum

Coordinating Planner I

Historic Preservation Division, Dept. of Housing and Economic Development

Amy E. Keller
Vice President and Preservation Committee Chair
Chicago Art Deco Society

August 1, 2013

Via Electronic Mail

Joseph Iacobucci
Manager, Strategic Planning
Chicago Transit Authority
567 West Lake Street, 10th Floor
Chicago, Illinois 60661-1465
jiacobucci@transitchicago.com

Re: Ashland Avenue Bus Rapid Transit Project, Comments from the Chicago Art Deco Society

Dear Mr. Iacobucci:

On behalf of the Chicago Art Deco Society ("CADS"), I wanted to extend our thanks for involving us in the Ashland Avenue Bus Rapid Transit Section 106 Consulting Parties Meeting. I appreciated the presentation and the work done by the Chicago Department of Transportation, the Department of Housing and Economic Development, and the Federal Transit Administration on this important project, and was able to share the information provided by the Ashland BRT Project to the CADS Board.

CADS is a 501(c)(3) non-profit organization, and its over 500 members located worldwide all have a shared appreciation of Chicago Interwar Period architecture, art, and design. On April 18, 2013, the CADS Preservation Committee submitted a Suggestion for Landmark Status to the Commission on Chicago Landmarks for the Ashland Avenue Bridge (attached), a 1937 structure designed by Chicago's own Scipione Del Campo. Landmarks Illinois has also identified the Ashland Avenue Bridge in its annual "Ten Most Endangered Historic Places" list. The Bridge is very special as it is the only remaining bascule bridge in the City designed by Del Campo, and contains many unique features exemplar of Art Deco design in the Interwar period. The CADS community submitted this landmarks suggestion after the Bridge was identified as threatened in a comprehensive survey CADS is conducting to document over 700 Art Deco buildings, sites, and monuments in the Chicagoland area, which will allow us to advocate for the preservation and restoration of these unique and historic structures in the future.

CADS is especially interested in the Ashland BRT Project because of its potential impact to the Ashland Avenue Bridge. Mr. Del Campo designed two bridges for the City of Chicago in the 1930s. The other bridge, which extended over Ogden Avenue, was demolished several years ago. The Ashland Avenue Bridge, while still standing, is in need of long-deferred maintenance and restoration.

We appreciate the work done by CDM Smith, Inc. to identify the BRT Project's potential impact on cultural and historic resources in and around the City. Per my comments at the Section 106 Consulting Parties Meeting on July 15, CADS would encourage and support the inclusion of the Ashland Avenue Bridge on CDM Smith's Cultural Resources report, in order to identify any potential impact the project would have on the Bridge, and to encourage much-needed restoration and deferred repair to the Bridge. We would also recommend that the Ashland BRT Project invest in infrastructure repairs—not only for the safety of the Bridge's drivers, bus passengers, and pedestrians—but to ensure that future generations can enjoy Mr. Del Campo's work, as well.

Thank you for allowing us to review and comment on the Ashland Avenue BRT Project. We look forward to working together in the future, and appreciate your consideration.

Sincerely,

Amy E. Keller
AEK: mgs

cc: Section 106 Consulting Party Meeting Attendees

Forest County Potawatomi
Cultural Center and Museum

POTAWATOMI
(Keeper of the Fire)

June 4, 2013

Marisol R. Simon, Regional Administrator
U.S. DOT
200 West Adams Street
Suite 320
Chicago, IL 60606

Re: Chicago Transit Authority Ashland Avenue Corridor Bus Rapid Transit Project Environmental Assessment – Section 106 Consulting Party Invitation

Dear Marisol R. Simon:

This letter is in response to the proposed project referenced above, as provided in the letter dated May 1, 2013. As this project occurs within Potawatomi ancestral and previously occupied lands, we would like to express our concerns with any impacts to historic and cultural properties located within the project area of potential effect for the project mentioned above.

We appreciate receiving results of an archival review, cultural resource investigation studies, and archaeological reports. Should there be an impact or effect to cultural or historic properties as a result of this project, we will request consultation pursuant to Section 106 of the National Historic Preservation Act, as amended.

You may send the results of the archival review, cultural resource assessments, and archaeological report to:

Forest County Potawatomi Community
Attn: Melissa Cook, Tribal Historic Preservation Officer
8130 Mish ko swen Drive
P.O. Box 340
Crandon, WI 54520
Melissa.Cook@fcpotawatomi-nsn.gov (for digital format)

If you have any questions, please contact me at 715-478-7248 or by email Melissa.Cook@fcpotawatomi-nsn.gov.

Respectfully,

Melissa Cook
Melissa Cook
Tribal Historic Preservation Officer

06-07-13P12:48 RCVD

5460 Everybody's Road • Crandon, Wisconsin 54520
Telephone (715) 478-7474 • (800) 960-5479 • Fax (715) 478-7482

From: Bill L. Quackenbush [mailto:Bill.Quackenbush@ho-chunk.com]
Sent: Tuesday, May 21, 2013 08:41 AM
To: reginald.arkell@dot.gov <reginald.arkell@dot.gov>; Iacobucci, Joseph
Subject: Ashland Avenue Corridor Bus Rapid Transit Project EA

Good morning Illinois DOT Reps,

The Ho-Chunk Nation thanks you for contacting us regarding your proposed undertaking known as the "Ashland Avenue Corridor Bus Rapid Transit Project".
We have no questions or concerns at this time, but would like to remain as an interested party throughout the duration of your project.

Thank you for your time in this matter,

William Quackenbush
Tribal Historic Preservation Officer
Cultural Resources Division Manager
Ho-Chunk Nation

Important Notice:
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THE RIDGE HISTORICAL SOCIETY
10621 SOUTH SEELEY AVENUE
CHICAGO, IL 60643
773-881-1675
e-mail: ridgehistory@hotmail.com
www.ridgehistoricalsociety.org

June 18, 2013

Joe Iacobucci
Manager
Chicago Transit Authority
Strategic Planning & Policy, 10th Floor
567 West Lake Street,
Chicago, IL 60661-1465

Re: Chicago Transit Authority Ashland Avenue Corridor Bus Rapid Transit Project
Environmental Assessment – Section 106 Consulting Party Invitation

Dear Mr. Iacobucci,

The Ridge Historical Society (RHS) received your invitation to participate as a Section 106 Consulting Party for the CTA's Ashland Avenue Corridor Bus Rapid Transit Project. RHS will participate as a Consulting Party.

The Ridge Historical Society (RHS) serves the Beverly, Morgan Park and Washington Heights community areas on Chicago's south side. For this reason, we are particularly interested in the preservation of impacted properties in the project area within our serviced community areas.

Please direct all correspondence to the Ridge Historical Society's designated representative:

Jennifer R. Kenny
Architectural Historian, Ridge Historical Society
9927 South Longwood Drive
Chicago, IL 60643
773-429-9831
jennifer.kenny@mindspring.com

Thank you,

Jennifer R. Kenny
Architectural Historian

From: William DeMille [mailto:wdemille1@yahoo.com]
Sent: Wednesday, May 08, 2013 9:00 AM
To: Iacobucci, Joseph
Cc: info@wlvn.org; Yael Hochberg; Marisa.Appleton@dot.gov; reginald.arkell@dot.gov; Mark.Assam@dot.gov
Subject: Re: [FWD: Chicago Transit Authority Ashland Avenue Corridor Bus Rapid Transit Project Environmental Assessment - Section 106 Consulting Party Invitation]

Mr. Iacobucci-

West Lakeview Neighbors would like to participate as a Section 106 Consulting Party. Yael Hochberg, whom I have copied on this email, will be our single point of contact.

If you have any questions or concerns, please let me know.

Thanks,

Will DeMille
President
West Lakeview Neighbors

wdemille1@yahoo.com
(312) 852-6707 cell
http://www.linkedin.com/in/willdemille

Section 106 Comment Responses

Ashland Avenue Bus Rapid Transit Project Section 106 Eligibility and Effects Responses to Comments

RE:	Section 106 Eligibility and Effects Meeting and Responses to Comments Received
DATE:	August 30, 2013
AUTHOR:	Robert Ball, CDM Smith, Inc.
TO:	All Consulting Parties

On behalf of the Chicago Transit Authority (CTA), we would like to thank you for your participation in the Section 106 Process. An Eligibility and Effects Meeting was held for this project on July 15, 2013. In addition, a 30-day comment period (ending August 2, 2013) was provided to obtain additional input from all consulting parties.

The following summary presents key issues raised during the July 15, 2013 Eligibility & Effects Meeting as well as additional comments from follow-up letters received during the comment period. Updates to the technical analysis memorandum have been made based on comments received, and all consulting parties are being provided with meeting material details as well as the updated Eligibility and Effects Memorandum. CTA is committed to continued coordination with the State Historic Preservation Officer (SHPO) through final design on this project. At this time, no impacts are anticipated to result from this project. Final determination on the Section 106 process will be made by the Federal Transit Administration (FTA) and SHPO.

Responses to Comments

1. **A number of consulting parties requested that the project team update the technical memorandum to include a review of the eligibility of the North Ashland Avenue Bridge for inclusion in the National Register of Historic Places (NRHP) and identify any impacts to the bridge that could result from the proposed project. In addition, comments received asked the project team to identify any repairs to the bridge that would be incorporated into the proposed project to improve safety or better preserve the existing bridge.**

   As requested, the North Ashland Avenue Bridge was examined for its eligibility for inclusion in the National Register of Historic Places. After reviewing the resource; the bridge is recommended as eligible and the technical memo has been revised to reflect the new recommendation. Please see Table 1 of the technical memorandum for addition of this bridge into the list of NRHP eligible recommendations on structures within the APE.

   The technical memorandum provides explanation on why a no adverse effects determination is recommended for the project, and this now includes the assessment of the North Ashland

Avenue Bridge. No historic structures, including the North Ashland Avenue Bridge, would be demolished or relocated for the project. Since a bus route currently exists along the corridor, there would not be new transportation elements introduced that would cause vibratory or noise impacts along the corridor. Based on the station designs, locations, and the characteristics that make each of the resources eligible (including the North Ashland Bridge), there would be no adverse impacts upon the eligible resources or districts (including the North Ashland Bridge). Because of these factors the determination of no adverse effects is recommended. If substantially different design parameters are used during final design, reassessment and/or additional coordination with the State Historic Preservation Office (SHPO) and other consulting parties may be required. This explanation is provided in the technical memorandum and addresses comments received regarding assessing impacts of the proposed project on the North Ashland Avenue Bridge.

No stations are proposed proximate to the North Ashland Avenue Bridge. Project improvements between stations (including the area along the corridor through the North Ashland Avenue Bridge) would include milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements. These improvements would not result in any potential adverse proximity effects to the location, design, setting, materials, workmanship, feeling, or association of this bridge. These project activities would serve to enhance safety and provide some minor improvements to the existing structure.

2. **The Department of Housing and Economic Development (DHED) requested that a separate category and listing of all the properties rated as "red" or "orange" on the Chicago Historic Resources Survey which fall within the Area of Potential Effect (APE) to be included in the technical memorandum regardless of eligibility.**

   An appendix (Attachment B) was added to the technical memo to list all the properties that fall within the APE that were rated either "red" or "orange" on the Chicago Historic Resources Survey. All these resources were field surveyed and the ones recommended eligible were placed within the body of the technical memorandum. Reference to the addition of this appendix has been incorporated into the technical memorandum. Please see the last sentence of paragraph three under the Identification Methodology section of the technical memorandum for reference.

   In addition, CTA is committed to continuing coordination with DHED, a project partner in the proposed project, through final design to ensure that potential effects of the project continue to be coordinated, and if necessary, mitigated through project development.

3. **DHED provided information on contributing structures included as part of the historic Chicago Park Boulevard System Historic District near Garfield Boulevard and Ashland Avenue and asked that this information be added to the technical memorandum along with an evaluation.**

   The Chicago Park Boulevard System Historic District was added to the technical memo along with an effects analysis. The finding of No Adverse Effect was recommended for this location. Please see the last bullet under the NRHP Listed Districts section and Attachment C (Station Area 26) of the technical memorandum for addition of this district into the assessment.

4. **Finally, the Illinois Historic Preservation Agency (IHPA) provided conditional concurrence on the recommendation of a No Adverse Effect determination for this project, and has requested that the project team continue to share plans and specifications for the project, particularly for plans related to historic districts and properties within the project corridor and with regard to treatment of the North Ashland Avenue Bridge, a "Bascule" bridge constructed in 1936.**

   As part of the Section 106 coordination process, CTA and FTA will be providing the IHPA with conceptual development plans as they continue to develop. Furthermore, CTA and FTA are committed to continuing coordination with the IHPA as final design development commences to ensure that plans and specifications for BRT stations within National Register Historic Districts and those adjacent to historic properties are fully coordinated with the IHPA.

   All proposed changes to the street layout for this proposed project would be constructed within existing right of way and no adverse impacts to historic properties or districts are anticipated to result from the proposed project.

   No stations are proposed proximate to the North Ashland Avenue Bridge. Project improvements between stations would include milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements. These improvements would not result in any potential adverse proximity effects to the location, design, setting, materials, workmanship, feeling, or association of this bridge. These project activities would serve to enhance safety and provide some minor improvements to the existing structure. More specific plans and specifications for the treatment of the North Ashland Avenue Bridge will be determined through final design. FTA and CTA are committed to continuing coordination with the IHPA as final design commences on these plans and specifications.

CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

September 19, 2013

Illinois Historic Preservation Agency
Attn: Ms. Anne E. Haaker
Deputy State Historic Preservation Officer
1 Old State Capitol Plaza
Springfield, Illinois 62701-1512

Re: Ashland Avenue Bus Rapid Transit (BRT) Project, Conditional Concurrence Response
IHPA Log # 012030513

Dear Ms. Haaker:

The Chicago Transit Authority (CTA) and the Federal Transit Administration (FTA) are continuing to prepare the Ashland Avenue BRT Project Environmental Assessment in accordance with the National Environmental Policy Act (NEPA). As part of the Section 106 process, an Eligibility and Effects Meeting was conducted on July 15, 2013 in accordance with the National Historic Preservation Act. Meeting materials, as well as a summary of the responses to comments and an updated Cultural Resources Eligibility and Effects Memorandum have been sent to all consulting parties who attended this meeting, and are being provided to you as well for your records.

Thank you for your July 18, 2013 letter of conditional concurrence on the recommendation of a No Adverse Effect determination for the Ashland Ave BRT Project. In response to your letter, we are enclosing a copy of the most current conceptual design plans with this letter for your review. Below are specific responses to your three requests for additional information on plans and specifications for the project.

1. *Please provide plans and specifications for bus stops located within National Register Historic Districts and for those that are adjacent to historic properties.*

   Conceptual plans are enclosed with this response. In addition, Attachment C of the Cultural Resources Eligibility and Effects Memorandum is enclosed and provides detailed information on all historic districts and historic properties near proposed stations, as well as determinations of potential effects for potential station locations. For reference, we have highlighted the planned conceptual station location configurations within this memo and corresponding effects determination (please see red text in Attachment C). When the effects assessment was initially conducted, a number of potential station layouts were under consideration and evaluated for a comprehensive analysis of potential effects. As shown in the conceptual plans as well as this memorandum, all stations are now planned to be constructed in the center median using existing right of way. Below, we have provided reference to the conceptual plan sheets related to stations located within National Register Historic Districts and those adjacent to historic properties. No adverse effects are expected to result from the proposed station layouts and configurations.

- Station1 – Irving Park Road (see Concept Plans p. 44): A median station is planned south of Irving Park Road.
- Station 4 – Belmont Avenue (see Concept Plans p. 42): A median station is planned north of Belmont Avenue.
- Station 9 – Division Street (see Concept Plans p. 35): A median station is planned north of Division Street.
- Station 12 – Lake Street (see Concept Plans p. 32): A median station is planned south of Lake Street.
- Station 13 – Madison Street (see Concept Plans p. 31): A median station is planned north of Madison Street.
- Station 14 – Jackson Street (see Concept Plans p. 31): A median station is planned south of Jackson Street.
- Station 16 – Polk Street (see Concept Plans p. 30): A median station is planned north of Polk Street.
- Station 17 – Roosevelt Road (see Concept Plans p. 29): A median station is planned north of Roosevelt Road.
- Station 18 – 18th Street (see Concept Plans p. 27): A median station is planned south of 18th Street.
- Station 19 – Blue Island Road/Cermak (see Concept Plans p. 26): A median station is planned north of Blue Island Road.
- Station 21 – 31st Street (see Concept Plans p. 22): A median station is planned north of 31st Street.
- Station 24 – 47th Street (see Concept Plans p. 18): A median station is planned south of 47th Street.
- Station 25 – 51st Street (see Concept Plans p. 17): A median station is planned north of 51st Street.
- Station 26 – Garfield Boulevard (see Concept Plans p. 16): A median station is planned north of Garfield Boulevard.
- Station 28 – 63rd Street (see Concept Plans p. 14): A median station is planned south of 63rd Street.

- Station 31 – 79th Street (see Concept Plans p. 9): A median station is planned north of 79th Street.
- Station 35 – 95th Street (see Concept Plans p. 4): A median station is planned north of 95th Street.

2. *We would also like to review any proposed changes to street or sidewalk configurations within historic districts.*

   Typical sections for the proposed project are provided on the conceptual plans on pages 2 and 3. A typical station layout is also provided on page 54. Sidewalk widths and configurations between stations would be retained (at approximately 15 feet). At stations, sidewalk widths would be increased by between two and thirteen feet (between 17 feet and 28 feet) throughout the project corridor to provide enhanced pedestrian space and safe crossings at each station. These enhancements would be accommodated using existing right of way, and are expected to positively impact station areas within all historic districts by providing additional pedestrian accessibility within these districts.

   CTA and FTA are committed to continuing coordination with the IHPA through final design to confirm that any proposed changes to street and sidewalk configurations within historic districts have no adverse effect on historic districts and contributing structures within the project Area of Potential Effect.

3. *Provide plans and specifications for the treatment of the North Ashland Avenue Bridge, a "Bascule" bridge constructed in 1936. Please note that Bascule bridges are included among the 2013 Ten Most Endangered Historic Places identified by Landmarks Illinois, and this Art Deco Style bridge is eligible for nomination to the National Register of Historic Places.*

   Page 38 of the conceptual plans shows the North Ashland Avenue Bridge. It is located just north of Webster Avenue. No stations are proposed proximate to the North Ashland Avenue Bridge. Project improvements between stations would include milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements. These improvements would not result in any potential adverse proximity effects to the location, design, setting, materials, workmanship, feeling, or association of this bridge. These project activities would serve to enhance safety and provide some minor improvements to the existing structure.

   More specific plans and specifications for the treatment of the North Ashland Avenue Bridge will be determined through final design, and CTA is committed to continuing coordination with the IHPA as final design commences on these plans and specifications.

After you have reviewed the enclosed materials, please let us know if you have any additional comments or require any additional information to satisfy the conditions outlined in your July 18, 2013 letter. CTA and FTA are committed to continued coordination with the IHPA as plans develop and through the final design process. Should any changes or modifications to design plans be determined by

FTA or the IHPA to change the Section 106 effects determination, we understand that additional Section 106 coordination may be required.

Once FTA has reviewed and approved the draft Environmental Assessment, a Notice of Availability for the Environmental Assessment will be issued and public hearings will be scheduled. We will continue to keep you informed of the status of the project as these next steps occur, so that you may review the draft Environmental Assessment and provide comments on this project as it proceeds. In the meantime, should you have any questions or comments on this project, please do not hesitate to contact me.

Sincerely,

Joe Iacobucci
Manager, Strategic Planning and Policy
Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661-1498

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
David J. Halpin, Illinois Historic Preservation Agency

CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
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September 19, 2013

Amy Keller
Chicago Art Deco Society
PO Box 1116
Evanston, IL 60204-1116

Re: Ashland Avenue Bus Rapid Transit (BRT) Project
Response to Comments, Section 106 Eligibility and Effects Meeting

Dear Section 106 Consulting Party:

Thank you for your participation and attendance at the Section 106 Eligibility and Effects Meeting for the Ashland Avenue Bus Rapid Transit (BRT) Project. This meeting was conducted on July 15, 2013 in accordance with Section 106 of the National Historic Preservation Act. Based on comments received during and subsequent to this meeting, the project Historic Eligibility and Effects Memorandum has been updated.

The following documents are included with this letter:

1. July 15, 2013 Section 106 Eligibility and Effects meeting notes
2. Responses to comments received at the Section 106 meeting and through the 30-day comment period
3. Updated Historic Eligibility and Effects Memorandum

Based on review with the Illinois Historic Preservation Agency (IHPA) and the Federal Transit Administration (FTA), no adverse effects on historic or archaeological resources are anticipated to result from the proposed project. The Chicago Transit Authority (CTA) and FTA are committed to working with the IHPA through final design to ensure that any potential effects of the proposed project are identified and addressed, as appropriate. The Chicago Department of Housing and Economic Development (DHED) is a project partner and will also continue to be involved through final design of this project.

CTA and FTA are continuing to prepare the Ashland Avenue BRT Project Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA). Once FTA has reviewed and approved the EA, a Notice of Availability for the EA will be issued and public hearings will be scheduled. We will continue to keep you informed of the status of the project as these next steps occur, so that you may review the EA and provide comments on this project as it proceeds. In the meantime, should you have any questions or comments on this project, please do not hesitate to contact me.

Sincerely,

Joe Iacobucci
Manager, Strategic Planning and Policy
Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661-1498

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
Anne E. Haaker, Illinois Historic Preservation Agency

cta
CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

September 19, 2013

Lisa DiChiera
Director of Advocacy
Landmarks Illinois
53 W. Jackson Blvd., Suite 1315
Chicago, IL 60604

Re: Ashland Avenue Bus Rapid Transit (BRT) Project
Response to Comments, Section 106 Eligibility and Effects Meeting

Dear Section 106 Consulting Party:

Thank you for your participation and attendance at the Section 106 Eligibility and Effects Meeting for the Ashland Avenue Bus Rapid Transit (BRT) Project. This meeting was conducted on July 15, 2013 in accordance with Section 106 of the National Historic Preservation Act. Based on comments received during and subsequent to this meeting, the project Historic Eligibility and Effects Memorandum has been updated.

The following documents are included with this letter:

1. July 15, 2013 Section 106 Eligibility and Effects meeting notes
2. Responses to comments received at the Section 106 meeting and through the 30-day comment period
3. Updated Historic Eligibility and Effects Memorandum

Based on review with the Illinois Historic Preservation Agency (IHPA) and the Federal Transit Administration (FTA), no adverse effects on historic or archaeological resources are anticipated to result from the proposed project. The Chicago Transit Authority (CTA) and FTA are committed to working with the IHPA through final design to ensure that any potential effects of the proposed project are identified and addressed, as appropriate. The Chicago Department of Housing and Economic Development (DHED) is a project partner and will also continue to be involved through final design of this project.

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Sincerely,

Joe Iacobucci
Manager, Strategic Planning and Policy
Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661-1498

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
Anne E. Haaker, Illinois Historic Preservation Agency

CHICAGO TRANSIT AUTHORITY

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September 19, 2013

Ghian Foreman
Executive Director
Greater Southwest Development Corporation
2601 W. 63rd Street
Chicago, IL 60629

Re: Ashland Avenue Bus Rapid Transit (BRT) Project
Response to Comments, Section 106 Eligibility and Effects Meeting

Dear Section 106 Consulting Party:

Thank you for your participation and attendance at the Section 106 Eligibility and Effects Meeting for the Ashland Avenue Bus Rapid Transit (BRT) Project. This meeting was conducted on July 15, 2013 in accordance with Section 106 of the National Historic Preservation Act. Based on comments received during and subsequent to this meeting, the project Historic Eligibility and Effects Memorandum has been updated.

The following documents are included with this letter:

1. July 15, 2013 Section 106 Eligibility and Effects meeting notes
2. Responses to comments received at the Section 106 meeting and through the 30-day comment period
3. Updated Historic Eligibility and Effects Memorandum

Based on review with the Illinois Historic Preservation Agency (IHPA) and the Federal Transit Administration (FTA), no adverse effects on historic or archaeological resources are anticipated to result from the proposed project. The Chicago Transit Authority (CTA) and FTA are committed to working with the IHPA through final design to ensure that any potential effects of the proposed project are identified and addressed, as appropriate. The Chicago Department of Housing and Economic Development (DHED) is a project partner and will also continue to be involved through final design of this project.

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Sincerely,

Joe Iacobucci
Manager, Strategic Planning and Policy
Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661-1498

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
Anne E. Haaker, Illinois Historic Preservation Agency

cta

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September 19, 2013

Terry Tatum
Coordinating Planner I
City of Chicago
Department of Housing and Economic Development
Historic Preservation Division
33 N. LaSalle Street, Room 1600
Chicago, IL 60602

Re: Ashland Avenue Bus Rapid Transit (BRT) Project
Response to Comments, Section 106 Eligibility and Effects Meeting

Dear Section 106 Consulting Party:

Thank you for your participation and attendance at the Section 106 Eligibility and Effects Meeting for the Ashland Avenue Bus Rapid Transit (BRT) Project. This meeting was conducted on July 15, 2013 in accordance with Section 106 of the National Historic Preservation Act. Based on comments received during and subsequent to this meeting, the project Historic Eligibility and Effects Memorandum has been updated.

The following documents are included with this letter:

1. July 15, 2013 Section 106 Eligibility and Effects meeting notes
2. Responses to comments received at the Section 106 meeting and through the 30-day comment period
3. Updated Historic Eligibility and Effects Memorandum

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Sincerely,

Joe Iacobucci
Manager, Strategic Planning and Policy
Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661-1498

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
Anne E. Haaker, Illinois Historic Preservation Agency

CHICAGO TRANSIT AUTHORITY

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TEL 312 664-7200
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September 25, 2013

Jennifer R. Kenny
Architectural Historian
The Ridge Historical Society
9927 South Longwood Drive
Chicago, IL 60643

Re: Ashland Avenue Bus Rapid Transit (BRT) Project
Response to Comments, Section 106 Eligibility and Effects Meeting

Dear Section 106 Consulting Party:

Thank you for your participation in the Section 106 process for the Ashland Avenue Bus Rapid Transit (BRT) Project. The Eligibility and Effects Meeting was conducted on July 15, 2013 in accordance with Section 106 of the National Historic Preservation Act. Based on comments received during and subsequent to this meeting, the project Historic Eligibility and Effects Memorandum has been updated.

The following documents are included with this letter:

1. July 15, 2013 Section 106 Eligibility and Effects meeting notes
2. Responses to comments received at the Section 106 meeting and through the 30-day comment period
3. Updated Historic Eligibility and Effects Memorandum

Based on review with the Illinois Historic Preservation Agency (IHPA) and the Federal Transit Administration (FTA), no adverse effects on historic or archaeological resources are anticipated to result from the proposed project. The Chicago Transit Authority (CTA) and FTA are committed to working with the IHPA through final design to ensure that any potential effects of the proposed project are identified and addressed, as appropriate. The Chicago Department of Housing and Economic Development (DHED) is a project partner and will also continue to be involved through final design of this project.

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Sincerely,

Joe Iacobucci
Manager, Strategic Planning and Policy
Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661-1498

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
Anne E. Haaker, Illinois Historic Preservation Agency

CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

September 25, 2013

Yael Hochberg
West Lakeview Neighbors

Re: Ashland Avenue Bus Rapid Transit (BRT) Project
Response to Comments, Section 106 Eligibility and Effects Meeting

Dear Section 106 Consulting Party:

Thank you for your participation in the Section 106 process for the Ashland Avenue Bus Rapid Transit (BRT) Project. The Eligibility and Effects Meeting was conducted on July 15, 2013 in accordance with Section 106 of the National Historic Preservation Act. Based on comments received during and subsequent to this meeting, the project Historic Eligibility and Effects Memorandum has been updated.

The following documents are included with this letter:

1. July 15, 2013 Section 106 Eligibility and Effects meeting notes
2. Responses to comments received at the Section 106 meeting and through the 30-day comment period
3. Updated Historic Eligibility and Effects Memorandum

Based on review with the Illinois Historic Preservation Agency (IHPA) and the Federal Transit Administration (FTA), no adverse effects on historic or archaeological resources are anticipated to result from the proposed project. The Chicago Transit Authority (CTA) and FTA are committed to working with the IHPA through final design to ensure that any potential effects of the proposed project are identified and addressed, as appropriate. The Chicago Department of Housing and Economic Development (DHED) is a project partner and will also continue to be involved through final design of this project.

CTA and FTA are continuing to prepare the Ashland Avenue BRT Project Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA). Once FTA has reviewed and approved the EA, a Notice of Availability for the EA will be issued and public hearings will be scheduled. We will continue to keep you informed of the status of the project as these next steps occur, so that you may review the EA and provide comments on this project as it proceeds. In the meantime, should you have any questions or comments on this project, please do not hesitate to contact me.

Sincerely,

Joe Iacobucci
Manager, Strategic Planning and Policy
Chicago Transit Authority
567 West Lake Street
Chicago, IL 60661-1498

cc: Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
Anne E. Haaker, Illinois Historic Preservation Agency

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION V
Illinois, Indiana,
Michigan, Minnesota,
Ohio, Wisconsin

200 West Adams Street
Suite 320
Chicago, IL 60606-5253
312-353-2789
312-886-0351 (fax)

September 19, 2013

Melissa Cook, Tribal Historic Preservation Officer
Forest County Potawatomi Community
8130 Mish ko swen Drive
P.O. Box 340
Crandon, WI 54520

Re: Ashland Avenue Bus Rapid Transit (BRT) Project Section 106 Coordination

Dear Ms. Cook:

Thank you for your letter dated June 4, 2013 in response to an invitation to participate in the Section 106 consultation process for the Ashland Avenue Bus Rapid Transit (BRT) Project. Based on the findings of the project team's review, and additional coordination with the Illinois Historic Preservation Agency (IHPA) and other Section 106 consulting parties, no adverse effects on historic or archeological resources are anticipated from the proposed project. Due to the limited ground disturbance anticipated to occur from project activities within the existing right-of-way of Ashland Avenue, no subsurface archaeological field investigations were conducted or are planned, and no archaeological monitoring of construction is planned.

As you requested, enclosed are the results of the cultural resources effects technical analysis. The Federal Transit Administration (FTA) and the Chicago Transit Authority (CTA) are committed to working with the IHPA through final design to ensure that any potential effects of the proposed project are identified and addressed, as appropriate.

FTA and CTA are continuing to prepare the Ashland Avenue BRT Project Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA). Once the EA has been reviewed and approved by FTA, a Notice of Availability for the EA will be issued and public hearings will be scheduled. We will continue to keep you informed of the status of the project as these next steps occur, so that you may review the EA and provide comments on this project as it proceeds.

In the meantime, should you have any questions or comments on this project, please contact either of the following: Joseph Iacobucci of CTA at (312) 681-4182, jiacobucci@transitchicago.com; or Reginald Arkell of FTA at (312) 886-3704, reginald.arkell@dot.gov. Thank you for your cooperation and interest in this project.

Sincerely,

Marisol Simón

Marisol R. Simón
Regional Administrator

cc: Joe Iacobucci, Chicago Transit Authority
Anne E. Haaker, Illinois Historic Preservation Agency

Enclosure: Ashland Avenue Bus Rapid Transit Project Cultural Resources Effects Technical Analysis

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION V
Illinois, Indiana,
Michigan, Minnesota,
Ohio, Wisconsin

200 West Adams Street
Suite 320
Chicago, IL 60606-5253
312-353-2789
312-886-0351 (fax)

September 24, 2013

William Quackenbush
Ho-Chunk Nation
P.O. Box 667
Black River Falls, WI 54615

Re: Ashland Avenue Bus Rapid Transit (BRT) Project, Section 106 Coordination

Dear Mr. Quackenbush:

Thank you for your email dated May 21, 2013 in response to an invitation to participate in the Section 106 consultation process for the Ashland Avenue Bus Rapid Transit (BRT) Project. Based on the project team's review, in addition to coordination with the Illinois Historic Preservation Agency (IHPA) and other Section 106 consulting parties, no adverse effects on historic or archeological resources are expected from the proposed project. Due to the limited ground disturbance anticipated from project activities within the existing Ashland Avenue right-of-way, subsurface archaeological field investigations and archaeological monitoring of construction will not be conducted.

Enclosed are the results of the cultural resources effects technical analysis. The Federal Transit Administration (FTA) and the Chicago Transit Authority (CTA) are committed to working with the IHPA through final design to ensure that any potential effects of the proposed project are identified and addressed, as appropriate.

FTA and CTA are continuing to prepare the Ashland Avenue BRT Project Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA). Once the EA has been reviewed and approved by FTA, a Notice of Availability for the document will be issued and public hearings will be scheduled. We will continue to keep you informed of the project status as these next steps occur, so that you may review the EA and provide comments.

If you have any questions or comments on this project, please contact either of the following: Joseph Iacobucci of CTA at (312) 681-4182, jiacobucci@transitchicago.com; or Reginald Arkell of FTA at (312) 886-3704, reginald.arkell@dot.gov. Thank you for your cooperation and interest in this project.

Sincerely,

Marisol Simón

Marisol R. Simón
Regional Administrator

cc: Joe Iacobucci, Chicago Transit Authority
Anne E. Haaker, Illinois Historic Preservation Agency

Enclosure: Ashland Avenue BRT Project Cultural Resources Effects Technical Analysis

IHPA Finding of No Effects Letter

Illinois Historic
Preservation Agency

FAX (217) 782-8161

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

Cook County
Chicago
Ashland Avenue Corridor Bus Rapid Transit Project
Ashland Ave. between Irving Park Road and 95th St.
IHPA Log #012030513

October 10, 2013

Joe Iacobucci
Chicago Transit Authority
567 W. Lake St., 10th Floor
Chicago, IL 60661-1465

Dear Mr. Iacobucci:

We have reviewed the specifications and assessed the impact of the project as submitted by your office.

In our opinion the project meets the Secretary of the Interior's "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings" and we concur in a finding of no adverse effect pursuant to 36 CFR Part 800 provided that the following conditions are met:

1. The proposed BRT stations and shelters located within historic districts must be placed in the median.
2. The proposed BRT stations and shelters located adjacent to properties listed on, or eligible for, the National Register of Historic Places must be placed in the median or the opposite side of the street.

We look forward to continuing coordination with the CTA and FTA through the final design of all elements of this undertaking.

If you have questions, please contact David J. Halpin, Cultural Resources Manager, at 217-785-4998.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

c: Terry Tatum, City of Chicago, Illinois
Marisol R. Simon, U.S. Department of Transportation
Reginald Arkell, U.S. Department of Transportation
Mark Assam, U.S. Department of Transportation
Marlise Fratinardo, Chicago Transit Authority

Section 106 Final Determination Correspondence

U.S. Department
of Transportation
**Federal Transit
Administration**

REGION V
Illinois, Indiana,
Michigan, Minnesota,
Ohio, Wisconsin

200 West Adams Street
Suite 320
Chicago, IL 60606-5253
312-353-2789
312-886-0351 (fax)

November 7, 2013

Amy Martin, Director
Illinois Historic Preservation Agency
Old State-Journal Register Building
313 South Sixth Street
Springfield, IL 62701

RE: Chicago Transit Authority Ashland Avenue Corridor Bus Rapid Transit Project, Chicago, Illinois: FTA Section 106 Eligibility and Effects Determination

Dear Ms. Martin:

On February 27, 2013, the Federal Transit Administration (FTA) submitted a Section 106 initiation letter to the Illinois Historic Preservation Agency (IHPA) for the proposed Chicago Transit Authority (CTA) Ashland Avenue Corridor Bus Rapid Transit Project (Ashland BRT Project) in Chicago, Illinois. The Ashland BRT Project is a federal undertaking and subject to Section 106 of the National Historic Preservation Act of 1966 and its implementing regulation (36 CFR Part 800). The Ashland BRT Project would extend along Ashland Avenue from Irving Park Road on the north to 95th Street on the south for a distance of approximately 16 miles. Modifications to be made on Ashland Avenue include construction of 35 BRT stations, spaced roughly every half mile and located in the roadway median, adjacent to one northbound and one southbound bus-only traffic lane. General traffic access on Ashland Avenue would be reduced to one lane in each direction. Other expected modifications to the Ashland Avenue right-of-way (ROW) include pavement milling/resurfacing, median/curb alterations, traffic signal upgrades, left turn restrictions, and removal of some street parking.

On March 5, 2013, the CTA submitted to IHPA a proposed methodology for Section 106 compliance on the Ashland BRT Project. This included an identified area of potential effect (APE) for cultural and historic resources within the corridor, approach for archival research and a field survey, coordination with consulting parties, and a 30-day comment period. The IHPA responded to CTA via correspondence dated March 18, 2013 and stated that the survey should not be limited to structures on or previously determined eligible for the National Register of Historic Places (NRHP).

IHPA indicated this could be remedied by conducting site visits at proposed locations of the 35 stations, and recording structures potentially eligible for the NRHP.

On July 15, 2013, the CTA held a Section 106 consulting parties meeting for the Ashland BRT Project. In correspondence to the CTA, dated July 18, 2013, the IHPA stated that conditionally the project will have no adverse effect on any historic properties. The conditions specified by IHPA were that the CTA provide: 1) plans and specifications for bus stops within and adjacent to National Register Historic Districts; 2) proposed changes to street/sidewalk configurations within historic districts, and; 3) plans and specifications for treatment of the North Ashland Avenue Bridge, constructed in 1936.

In subsequent correspondence dated September 19, 2013, CTA provided a summary of Section 106 consulting party comments and responses, and an updated historic eligibility and effects memorandum to IHPA and the other participating consulting parties. CTA also provided the IHPA with conceptual design plans. In correspondence to CTA dated October 10, 2013, the IHPA stated that conditionally the Ashland BRT Project will have no adverse effect on historic properties pursuant to 36 CFR Part 800. The conditions are as follows: 1) the stations within historic districts must be placed within the median, and; 2) stations located adjacent to properties listed on or eligible for the NRHP must be placed in the median or the opposite side of the street. As described above, all 35 stations proposed with the Ashland BRT Project would be located within the median of Ashland Avenue.

FTA is providing the following determinations on the Ashland BRT Project based on the aforementioned documentation, particularly the enclosed Cultural Resources Technical Memorandum, dated November 5, 2013:

- The defined APE includes the ROW of Ashland Avenue in addition to buildings visible from or immediately adjacent to proposed stations;
- Five NRHP listed or determined eligible historic districts are located within or adjacent to the APE: 1) East Ravenswood Historic District; 2) West Jackson Boulevard Historic District; 3) Pilsen Historic District; 4) Chicago Sanitary and Ship Canal Historic District; and 5) Chicago Park Boulevard System Historic District;
- 25 individual properties within the APE are on or eligible for the NRHP as listed in Table 1 of the enclosed memorandum;
- 2 previously recorded archaeological sites are located within or adjacent to the APE: 1) Site 11-Ck-350 is a historic site that contains the remaining endpoint of the Illinois and Michigan Canal; and 2) Site 11-Ck-781 is the Central Manufacturing District – part of the first American Industrial Park, established in 1905.
- The Ashland BRT Project would have **no adverse effect** on resources on or eligible for the NRHP.

RE: Chicago Transit Authority Ashland Avenue Corridor Bus Rapid Transit Project, Chicago, Illinois: FTA Section 106 Eligibility and Effects Determination

Pursuant to the Section 106 implementing regulations at 36 CFR 800, FTA is seeking SHPO concurrence with the above eligibility and effects determinations within 30 days of receipt of this letter. If FTA can provide any assistance or additional information which would aid in your prompt reply, please feel free to contact Reginald Arkell, Community Planner at 312-886-3704. Thank you for your assistance.

Sincerely,

Marisol R. Simón
Regional Administrator

Cc: Reginald Arkell, FTA
Mark Assam, FTA
Joseph Iacobucci, CTA

Enclosure

Ashland Avenue
Bus Rapid Transit Project

Memorandum

Date: *November 5, 2013*

Subject: *Cultural Resources*

Prepared By: CDM Smith, Inc.

Introduction

The Chicago Transit Authority (CTA), in cooperation with the Chicago Department of Transportation (CDOT), Department of Housing and Economic Development (DHED), and FTA, is proposing to implement Bus Rapid Transit (BRT) features and service along Ashland Avenue in Chicago, Illinois. The limits for the Ashland Avenue BRT Project are:

- Irving Park Road on the north to 95th Street on the south (approximately 16.1 miles)

CTA currently operates local bus service within the Ashland Avenue BRT Project limits. The proposed improvements are limited in scope and would be implemented within existing roadway rights-of-way:

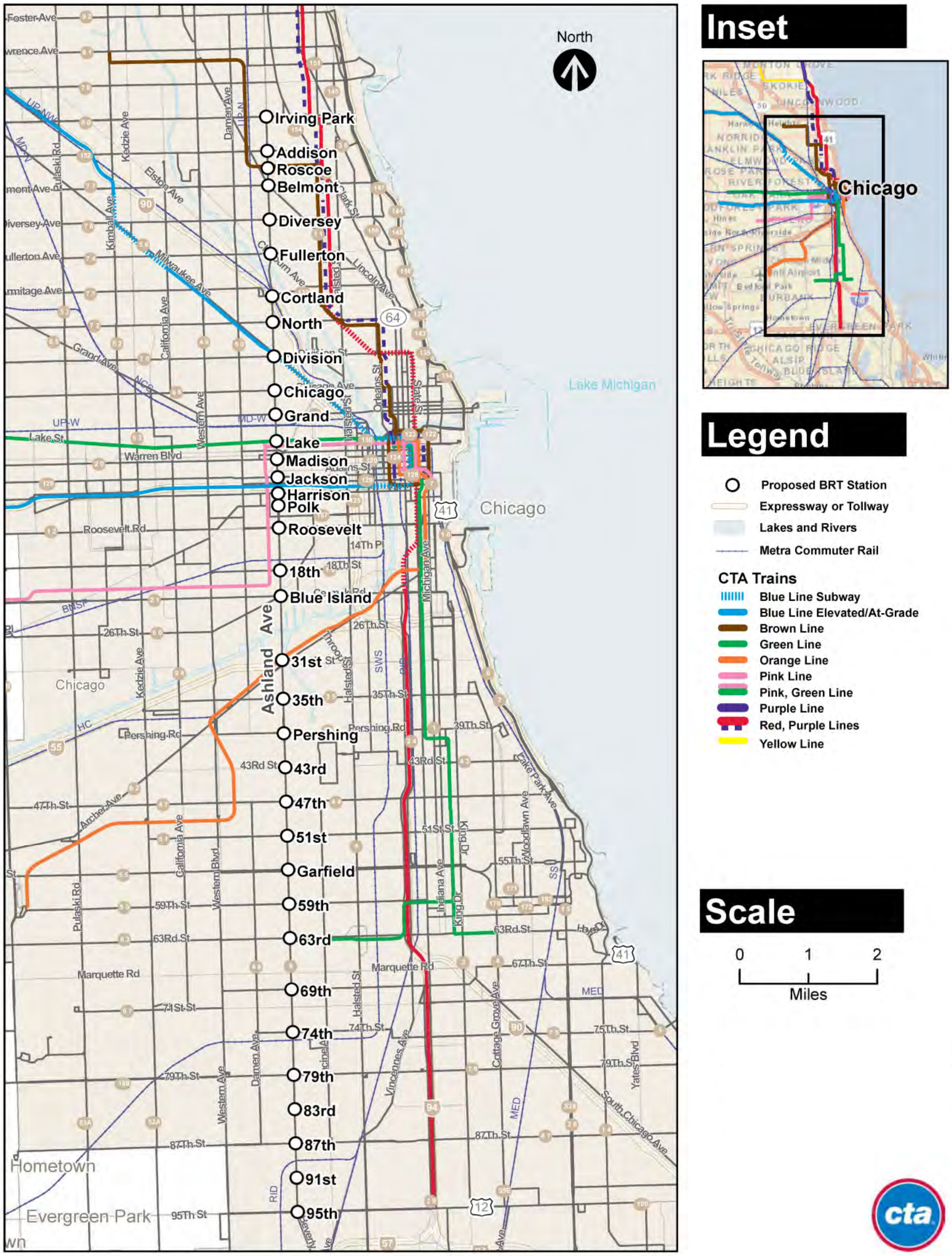
- Construction of median BRT stations with shelters and pedestrian boarding areas
- Upgrade of traffic signal systems to include transit signal priority
- Implementation of queue jump lanes and turn restrictions at intersections
- Removal of travel lanes to accommodate a designated bus lane in each direction
- Pavement milling and resurfacing
- Streetscape improvements including medians, landscaping, and ADA-accessibility upgrades

There are 35 proposed BRT station locations, which are shown in **Figure 1.**

Purpose

The purpose of this memorandum is to evaluate the impact of the proposed project on cultural resources and for documenting compliance with Section 106 of the National Historic Preservation Act.

Figure 1: Proposed BRT Station Location Map



The following sections include a description of the Area of Potential Effect (APE), an overview of archival research activities, a description of the level of identification efforts conducted, and a summary of the documentation effort. **Attachment A** contains a primer which explains in more detail the concepts associated with the analysis and accompanying Section 106 consultation process.

Identification Methodology

Cultural resource specialists, in consultation with FTA and IHPA, developed an APE for cultural/historic resources along the Ashland Avenue BRT Project corridor. The APE takes into account the location of proposed BRT stations as well as the potential for other effects (e.g. visual changes) that could impact historic resources.

The APE is confined to the right-of-way in the areas between the station locations because the project activities between stations (including milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements) would not result in any potential adverse proximity effects to the location, design, setting, materials, workmanship, feeling, or association of nearby historic resources. Because the project area is located within a heavily urbanized area, the boundaries for the APE at the proposed station locations were based on the area directly impacted by construction plus a buffer to account for potential visual changes. The exact size of the buffer varies for each station based on the location, setting and building sizes in the area.

To identify historic architectural resources in the APE, the Historic Architectural Resources Geographic Information System (HARGIS), the National Register of Historic Places (NRHP) database, and city records--including the Chicago Landmarks List and the Chicago Historic Resources Survey (CHRS)--were reviewed. Using this information, a list of NRHP listed and previously determined eligible properties within the APE was compiled. This effort included the identification of known archaeological sites, NRHP listed districts and structures, CHRS properties rated Orange or Red, locally listed historic landmarks, and any additional properties previously identified as eligible for the NRHP. CHRS Red properties denote resources that possess some architectural features or historical association that make them potentially significant at the city, state, or national level; CHRS Orange properties denote resources that possess some architectural features or historical association that make them potentially significant at the community level. **Attachment B** contains a complete listing of all properties rated as “red” or “orange” on the CHRS that fall within the APE.

Consistent with the regulations (36 CFR 800.4.b.1), the team has considered past planning, research and studies; the magnitude and nature of the undertaking; the nature and extent of potential effects on historic properties; and the likely nature and location of historic properties within the APE in its identification efforts. As with the development of the APE, the survey and documentation methodology was developed in consultation with FTA and IHPA.

The archival research identified five NHRP historic districts, four local landmarks, and 34 CHRS Red or Orange properties within the APE. Following archival research, the team’s architectural historian completed a windshield survey in March 2013 of the Ashland Avenue BRT Project APE, noting buildings within the APE that exhibit distinguishing architectural features associated with historic styles. During the March 2013 field visit, the historian examined structures surrounding each of the 35 station areas and noted individual structures within the APE (including the Red, Orange coded properties, local landmarks, etc.) that exhibited a level of historic architectural significance that could make them candidates for historic evaluation. Each of these were photographed and assessed within the context of their community to determine their eligibility for NRHP listing. Following this assessment, 25 individual properties within the APE have been NRHP listed previously or are recommended as NRHP eligible. **Table 1** depicts NRHP listed resources, additional resources recommended as NRHP eligible, CHRS Orange/Red properties, and local landmarks within the APE. The primer in **Attachment A** provides information on eligibility criteria.

NRHP Listed Districts

Portions of five NRHP listed or determined eligible historic districts fall within or adjacent to the APE:

- East Ravenswood Historic District, a collection of over 1,500 residential, commercial, and industrial buildings roughly bounded by Lawrence Avenue, Clark Street, Irving Park Road, and Ravenswood Avenue. The district is locally significant under Criterion A for its association with community planning and development and under Criterion C for its architecture.

- West Jackson Boulevard Historic District, which is bounded by Laflin, Ashland, Adams and Van Buren streets includes 40 contributing structures on approximately 8.5 acres. The district is listed under Criterion C for its architecture, with a period of significance of 1876-1890.

- Pilsen Historic District, roughly bounded by 16th Street, Cermak Road, Halsted Street, and Western Avenue, which contains over 4,400 contributing structures. The district is listed under Criterion A for its association with ethnic heritage (Bohemian-American and Mexican-American cultures), industry, and social history. It is also listed under Criterion C for its architecture.

- Chicago Sanitary and Ship Canal Historic District, within Chicago city limits, is bounded by the footprint of the waterway and extends from just east of Ashland Avenue (near 29th Street) to just west of Cicero Avenue (near 41st Street). The entire Chicago Sanitary and Ship Canal is 28 miles long and forms a shipping link between Lake Michigan and the Mississippi River system. The district is listed under Criterion A for its association with maritime history, commerce, transportation, community planning, and development and under Criterion C for its architecture, with a period of significance of 1875-1974.

- Chicago Park Boulevard System Historic District, is approximately 26 miles in length and contains a continuous system of parks and boulevards from the southeast part of Chicago at Dr. Martin Luther King, Jr. Drive, west, north and back east, to the eastern end of Logan

Boulevard. It contains eight parks, 19 boulevards and six squares. The historic district intersects with the APE for the project where Ashland Avenue intersects with Garfield Boulevard, nearest to Sherman Park. The district was determined eligible under Criterion A for its association with community planning and development, and under Criterion C for its architecture and landscape architecture with a period of significance of 1869–1964.

Table 1: NRHP Eligibility Recommendations for Buildings and Structures within the APE

Property Description	Date	CHRS	Landmark	NRHP
Gothic Revival School, 4015 North Ashland Avenue	1893	Orange	No	Recommended Eligible, Contributing element within the East Ravenswood Historic District
Classical Revival Mixed Use Building, 3175 North Lincoln Avenue	1890s	No	No	Recommended Eligible
Classical Revival Mixed Use Building, 1545 West Division Street	1920s	No	No	Recommended Eligible
Classical Revival Mixed Use Bldg, 1200 North Ashland Avenue	1920s	Orange	Yes	Listed
Vernacular Commercial Building, 238 North Ashland Avenue	1910s	Orange	No	Recommended Eligible
Queen Anne Train Station , Lake Street at Ashland Avenue	1890s	Orange	No	Recommended Eligible
Art Deco/Moderne Gymnasium, 1545 West Lake Street	1900s	Orange	No	Recommended Eligible
Art Deco/Moderne Hotel, 1521 West Warren Boulevard	1920s	Orange	Yes	Listed
Italianate Mixed Use Building, 236-238 South Ashland Avenue	1889	Orange	No	Recommended Eligible
Romanesque Revival Residential Bldg, 1539 West Jackson Boulevard	1889	Orange	Yes	Recommended Eligible, Contributing element within the West Jackson Boulevard Historic District
Romanesque Revival Residential Bldg, 315 South Ashland Avenue	1890s	Orange	No	Recommended Eligible, Contributing element within the West Jackson Boulevard Historic District
Classical Revival Church, 733 South Ashland Avenue	1910s	Orange	No	Recommended Eligible
Gothic Revival Church, 1132 South Ashland Avenue	1880s	Orange	No	Recommended Eligible

Property Description	Date	CHRS	Landmark	NRHP
Renaissance Revival Mixed Use Bldg, 1812 South Ashland Avenue	1890s	Orange	No	Recommended Eligible, Contributing element within the Pilsen Historic District
Industrial Building, 3538 South Ashland Avenue	1910s	Orange	No	Recommended Eligible
Classical Revival Commercial Bldg, 4700 South Ashland Avenue	1910s	Orange	Yes	NRHP Listed
Classical Revival Mixed Use Building, 5043 South Ashland Avenue	1893	Orange	No	Recommended Eligible
Classical Revival School, 1614 West 51st Street	1924	No	No	Recommended Eligible
Gothic Revival Church, 1624 West 51st Street	1900s	Orange	No	Recommended Eligible
North Ashland Avenue Bridge, Ashland Avenue crossing of the North Branch Chicago River	1936	No	No	Determined Eligible
Classical Revival Commercial Building, 1534 West 63rd Street	1900s	Orange	No	Recommended Eligible
Classical Revival Mixed Use Building, 7845 South Ashland Avenue	1920s	Orange	No	Recommended Eligible
Art Deco/ Moderne Mixed Use Bldg, 7912 South Ashland Avenue	1930s	No	No	Recommended Eligible
Art Deco/ Moderne Mixed Use Bldg, 7922 South Ashland Avenue	1931	No	No	Recommended Eligible
Classical Revival Mixed Use Building, 9459 South Ashland Avenue	1880s	No	No	Recommended Eligible

Overview of Known Archaeological Sites

Two previously recorded archaeological sites were identified along the Ashland Avenue corridor.

- Site 11-Ck-350 is a historic site that contains the remaining endpoint of the Illinois and Michigan Canal.
- Site 11-Ck-781 is the Central Manufacturing District. It is part of the first American industrial park, established in 1905.

No archaeological field investigations are expected due to the limited nature of the project and the location within the existing-right-of-way. This project does not include any monitoring or invasive investigations.

Assessment of Effects

Effects for each NRHP listed or eligible resource within the APE were assessed. The assessment of adverse effects has been conducted according to the criteria of adverse effect (36 CFR 800.5). Per regulations from the Advisory Council on Historic Preservation (See **Attachment A**), an Adverse Effect is an "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places" such that a resource's location, design, setting, materials, workmanship, feeling, or association is diminished.

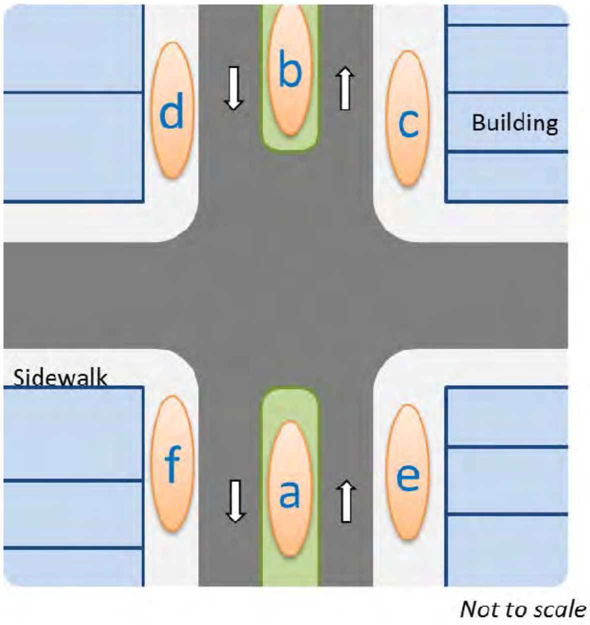
A No Adverse Effect determination is found when the undertaking's effects do not meet the criteria of the preceding paragraph on adverse effects or the undertaking is modified or conditions are imposed to avoid adverse effects. No Effect is found when there are no historic properties present or there are historic properties present but the undertaking will have no impact on them.

Although median stations are the preferred option and would be constructed at most stations, curbside stations may be provided at a few locations, due to roadway geometrics and/or access considerations to adjacent land uses. Because the exact placement for each station is not known at this time, the effects for six potential configurations at each of the 35 station locations are considered:

- Median station south of the cross street
- Median station north of the cross street
- Curbside station in the northeast quadrant of the intersection
- Curbside station in the northwest quadrant of the intersection
- Curbside station in the southeast quadrant of the intersection
- Curbside station in the southwest quadrant of the intersection

Figure 2 shows the six potential configurations graphically.

Figure 2: Potential Station Locations



Attachment C presents information about each station area that contains NRHP listed or eligible resources. Of the 35 proposed station locations along the corridor, 17 contain historic resources and are included in this report. For each recommended eligible and listed resource, tables in **Attachment C** describe the six possible station configurations and whether or not they result in any adverse effects on nearby historic properties. Figures depicting the APE and identified resources are also provided for each of the 17 stations. Analysis assumes all stations are located along Ashland Avenue, within existing right-of-way and in the immediate vicinity of the identified cross street.

Figures 3 and **4** show conceptual renderings for both a median and curbside station, respectively; these designs formed the basis of the effects analysis. For the median stations that fall outside of historic districts, given their location within the center of the roadway, they are far enough from the resources to not have an adverse effect in either the north or south locations. Median stations that do fall within historic districts would be designed in a context sensitive way as not to create an adverse effect upon the district. For curbside stations that fall within the same quadrant of a historic resource, since the design is similar to existing shelter designs, they would not have an adverse effect upon the resources.

No historic structures would be demolished or relocated for the project. Since a bus route currently exists along the corridor, there would not be new transportation elements introduced that would cause vibratory or noise impacts along the corridor. Based on the station designs, locations, and the characteristics that make each of the resources eligible, there would be no adverse impacts upon the eligible resources or districts. Because of these factors the determination of no adverse effects is recommended. If substantially different design parameters are used during final design, reassessment and/or additional coordination with the State Historic Preservation Office (SHPO) and other consulting parties may be required.

Figure 3: Typical Median Station Conceptual Design

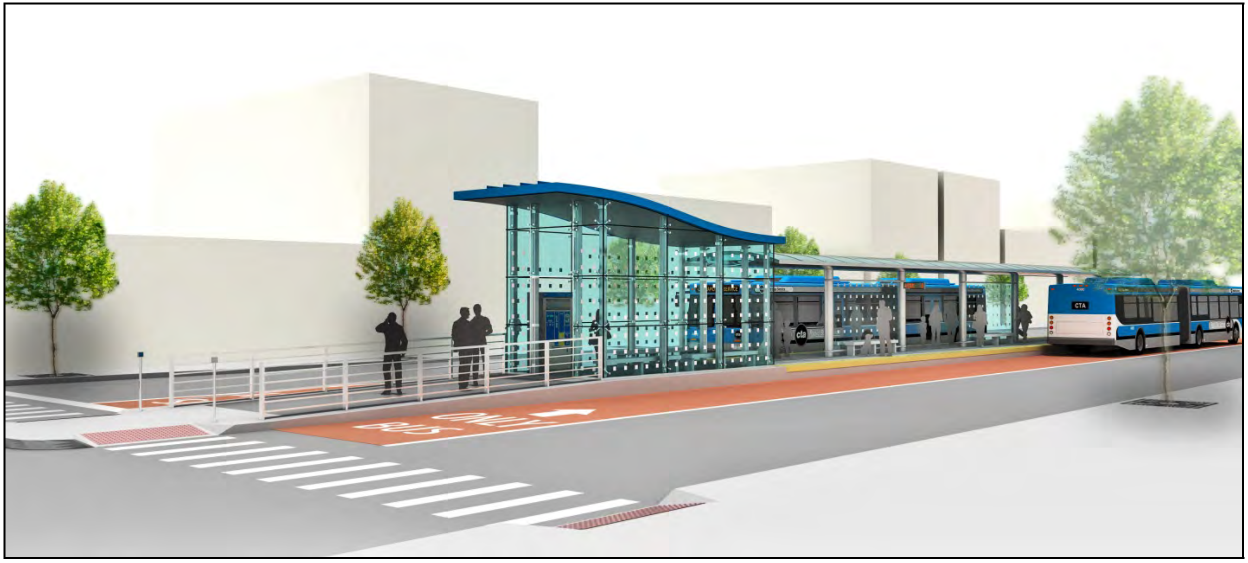
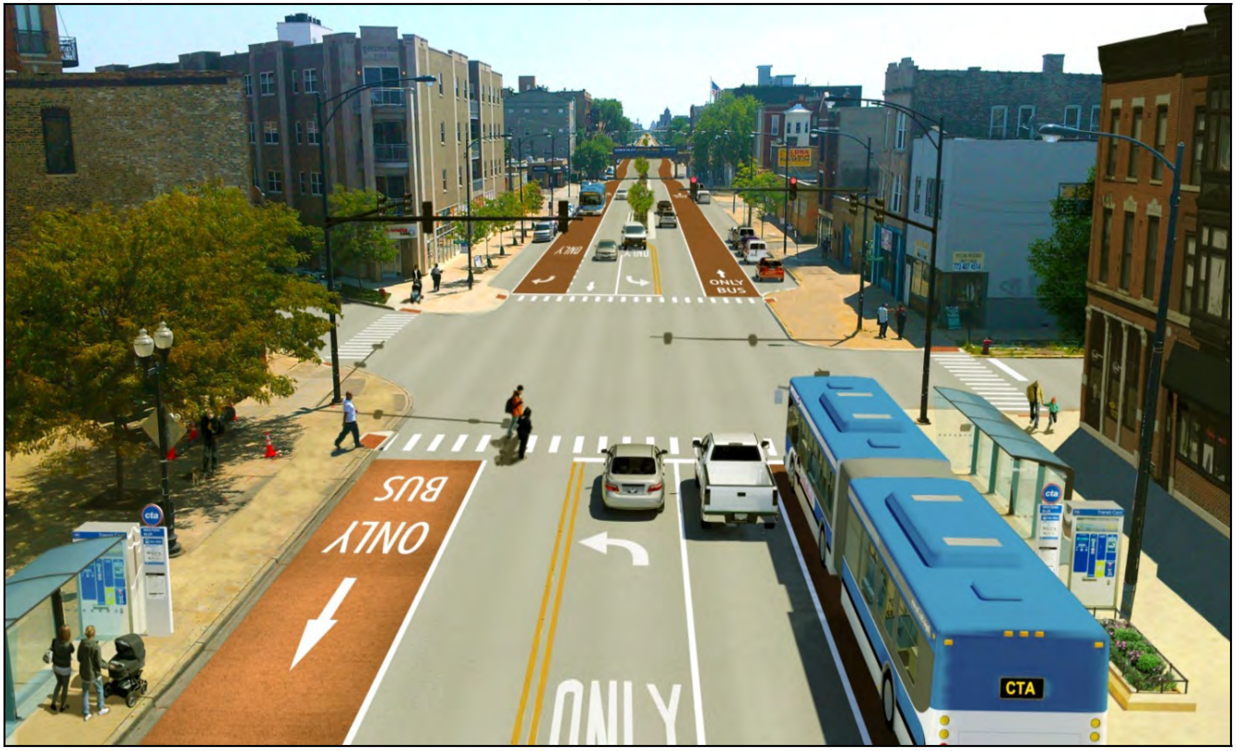


Figure 4: Typical Curbside Station Conceptual Design



Attachment A

Consultation Primer

Cultural and historic resources are protected by various federal regulations. Most notably, Section 106 of the National Historic Preservation Act requires federal agencies to consider impacts to historic resources from their actions, and to balance preservation needs with the need for the proposed project. The Section 106 process "seeks to accommodate historic preservation concerns with the need of federal undertakings through consultation … The goal of the consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties" (36 CFR 800.1(a)).

As part of the process, the project team will work through a three-step process with consulting parties to (1) identify historic properties that could be potentially affected by the project; (2) assess project effects on these resources; and (3) develop ways to avoid, minimize, or mitigate adverse effects on historic properties. A variety of organizations are eligible to participate in the consultation process, including the State Historic Preservation Office (SHPO), Tribal Historic Preservation Offices (THPO), local governments, and other organizations/individuals with a demonstrated interest in the project or the affected properties.

Definition of the APE

Prior to historic resource identification efforts, the project team developed the Area of Potential Effects (APE) in consultation with the SHPO. The APE defines the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist. Its boundaries are defined to encompass geographic areas where project effects may occur, independent of the presence of historic properties or districts.

Eligibility Determinations for Aboveground Historic Resources

Cultural historians then conducted research and field visits to identify properties which are listed in or eligible for listing in the National Register of Historic Places (NRHP). The NRHP is the nation's official list of properties recognized for their significance in American history, architecture, archaeology, engineering, and culture. It is maintained by the National Park Service and includes districts, sites, buildings, structures, and objects. To be eligible for listing in the NRHP, a property must meet at least one of four criteria:

A. Association with events that have made a significant contribution to broad patterns in history
B. Association with persons significant to the past
C. Embodiment of distinctive architectural design or construction characteristics
D. Potential to yield information important to history or prehistory (e.g. archaeological sites)

In addition, a property must also maintain a degree of integrity; that is, it must retain adequate integrity to convey the characteristics that make it significant. **Table 1** summarizes the seven aspects of integrity, defined in 36 CFR 60, which identifies procedures to evaluate properties for listing on the NRHP.

Table 1: Aspects of Integrity

Integrity	Definition
Location	Location is the place where the historic property was constructed or the place where the historic event occurred.
Design	Design is the combination of elements that create form, plan, space, structure and style of a property.
Setting	Setting is the physical environment of a historic property.
Materials	Materials are the physical elements that were combined or deposited during a particular period of a time and in a particular pattern or configuration to form a historic property.
Workmanship	Workmanship is the physical evidence of the crafts of a particular culture or people during any give period in history or prehistory.
Association	Association is the direct link between an important historic event or person and a historic property.
Feeling	Feeling is a property's expression of the aesthetic or historic sense of a particular period of time.

Determination of Effects

Once NRHP listed and eligible resources were identified, the project team relied on technical analyses to identify project impacts such as displacements, changes in noise levels, or alterations to the visual environment. Impacts resulting from each alternative were examined to determine whether they would result in an adverse effect on aboveground historic resources.

Per the Advisory Council on Historic Preservation, an adverse effect is an "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places" such that the property's location, design, setting, materials, workmanship, feeling, or association is diminished (36 CFR 800.5). This can include direct effects (caused by the action and occurring at the same time and place), indirect effects (reasonably foreseeable effects caused by the action but occurring later in time or farther removed), or cumulative effects (changes considered alongside effects from other projects).

A "No Adverse Effect" determination is found when the project's effects do not meet the criteria of the preceding paragraph, the undertaking is modified, or conditions are imposed to avoid adverse effects. A "No Effect" determination is found when the project will have no impact on a particular historic resource. A "No Historic Properties Affected" determination is found for the overall project when either there are no historic properties present or there are historic properties present but the project will have no impact on any of them.

Mitigating Adverse Effects

Once the project team has determined which historic resources (if any) are adversely affected by the project, the team will work with consulting parties to identify measures to avoid, minimize, and mitigate these impacts. As needed, commitments will be formalized in a Memorandum of Agreement between the federal agency, local lead agency, SHPO, and other signatories.

Attachment B

Property	**Date**	**CHRS**	**Nearest Proposed Station Location**
Colonial Revival Mixed Use Building 9109 South Ashland Avenue	1920s	Orange	91st Street
Art Deco/ Moderne Mixed Use Bldg. 7909 South Ashland Avenue	1930s	Orange	79th Street
Classical Revival Mixed Use Building 7845 South Ashland Avenue	1920s	Orange	79th Street
Classical Revival Commercial Building 1534 West 63rd Street	1900s	Orange	63rd Street
Gothic Revival Church 1624 West 51st Street	1900s	Orange	51st Street
Classical Revival Mixed Use Building 5043 South Ashland Avenue	1893	Orange	51st Street
Classical Revival Commercial Bldg. 4700 South Ashland Avenue	1910s	Orange	47th Street
Industrial Building 3538 South Ashland Avenue	1910s	Orange	35th Street
Italianate Mixed Use Building 1724 South Ashland Avenue	1880s	Orange	18th Street
Colonial Revival Mixed Use Building 1718 South Ashland Avenue	1900s	Orange	18th Street
Queen Anne Residential Building 1815 South Ashland Avenue	1880s	Orange	18th Street
Romanesque Revival Mixed Use Bldg. 1820 South Ashland Avenue	1890s	Orange	18th Street
Renaissance Revival Mixed Use Bldg. 1812 South Ashland Avenue	1890s	Orange	18th Street
Italianate Mixed Use Building 1804 South Ashland Avenue	1880s	Orange	18th Street
Gothic Revival Church 1132 South Ashland Avenue	1880s	Orange	Roosevelt
Classical Revival Church 733 South Ashland Avenue	1910s	Orange	Polk
Romanesque Revival Residential Bldg. 315 South Ashland Avenue	1890s	Orange	Jackson
Romanesque Revival Residential Bldg. 1539 West Jackson Boulevard	1889	Orange	Jackson
Italianate Mixed Use Building 234 - 238 South Ashland Avenue	1889	Orange	Jackson
Classical Revival Mixed Use Building 36 South Ashland Avenue	1890s	Orange	Madison
Art Deco/Moderne Hotel 1521 West Warren Boulevard	1920s	Orange	Madison
Art Deco/Moderne Gymnasium 1545 West Lake Street	1900s	Orange	Lake

Property	**Date**	**CHRS**	**Nearest Proposed Station Location**
Queen Anne Train Station Lake Street at Ashland Avenue	1890s	Orange	Lake
Vernacular Commercial Building 238 North Ashland Avenue	1910s	Orange	Lake
Queen Anne Mixed Use Building 1553 West Chicago Avenue	1880s	Orange	Chicago
Art Deco/ Moderne Mixed Use Bldg. 1200 North Ashland Avenue	1920s	Orange	Division
Italianate Mixed Use Building 1184 North Milwaukee Avenue	1880s	Orange	Division
Classical Revival Mixed Use Building 1201 North Milwaukee Avenue	1920s	Orange	Division
Classical Revival Commercial Building 1214 North Ashland Avenue	1900s	Orange	Division
Art Deco/ Moderne Mixed Use Bldg. 1227 North Milwaukee Avenue	1930s	Orange	Division
Italianate Mixed Use Building 1548 West Fullerton Avenue	1890s	Orange	Fullerton
Art Deco/ Moderne Mixed Use Bldg. 3204 North Lincoln Avenue	1920s	Orange	Belmont
Art Deco/ Moderne Mixed Use Bldg. 3225 North Ashland Avenue	1930s	Orange	Belmont
Gothic Revival School 4015 North Ashland Avenue	1893	Orange	Irving Park

Attachment C

Station Area 1: Irving Park

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, multi-family residences, a school, and modern buildings including a fast food restaurant. The East Ravenswood Historic District begins on the north side of the intersection. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 4015 North Ashland Avenue: Gothic Revival Lakeview High School	1893	Orange	No	Recommended Eligible; Contributing element with the East Ravenswood Historic District
2. East Ravenswood Historic District: a collection of over 1,500 residential, commercial, and industrial buildings roughly bounded by Lawrence Avenue, Clark Street, Irving Park Road, and Ravenswood Avenue	1880-1940	n/a	n/a	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 4015 North Ashland Avenue	- Median Station north or south of Irving Park Rd - SB Curbside Station north or south of Irving Park Rd - NB Curbside Station south of Irving Park Rd - NB Curbside Station north of Irving Park Rd*
2. East Ravenswood Historic District	- Median Station south of Irving Park Rd - SB Curbside Station south of Irving Park Rd - NB Curbside Station south of Irving Park Rd - Curbside or Median Station north of Irving Park Rd**

* Due to design of station being similar in size and scale to existing shelters along the corridor

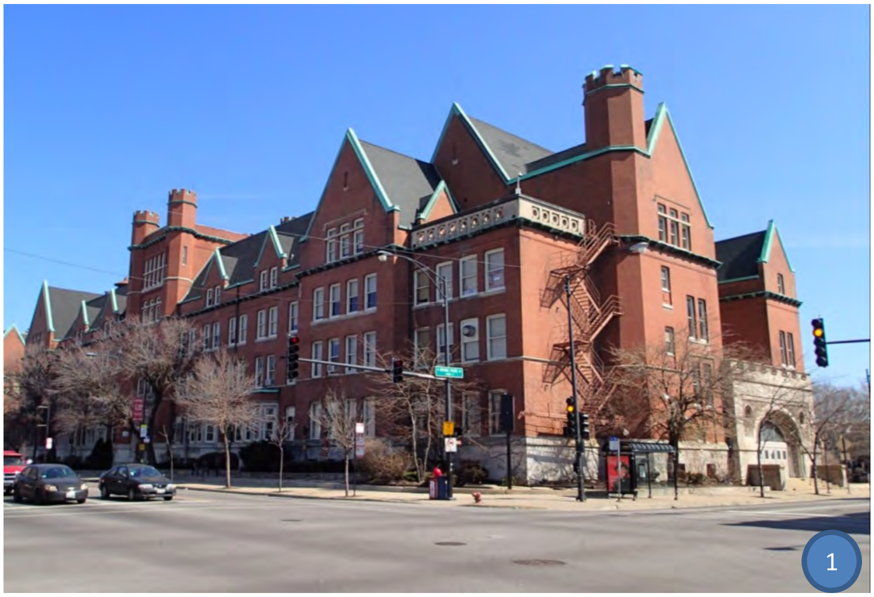
** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor

Photos:

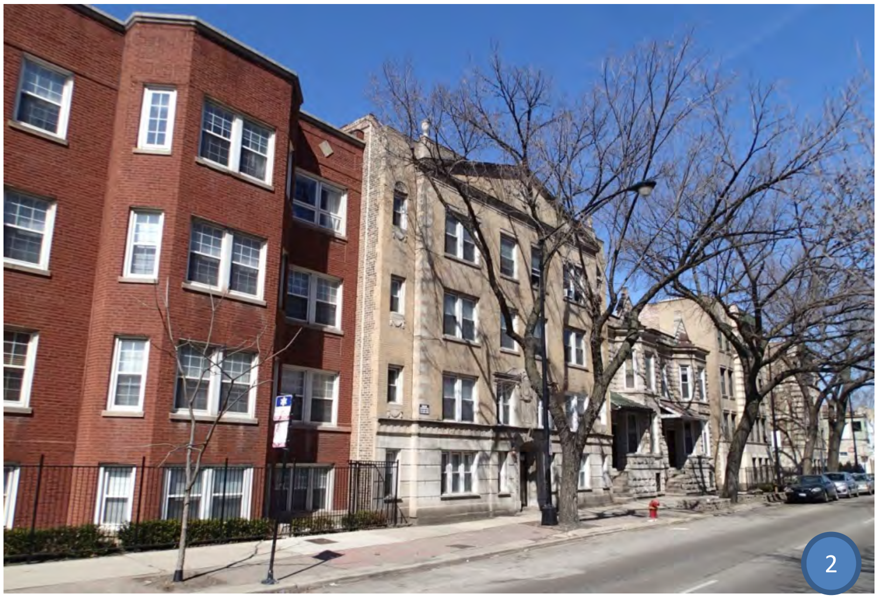
See Next Page

Station Area 1: Irving Park Cont'd

Photos:

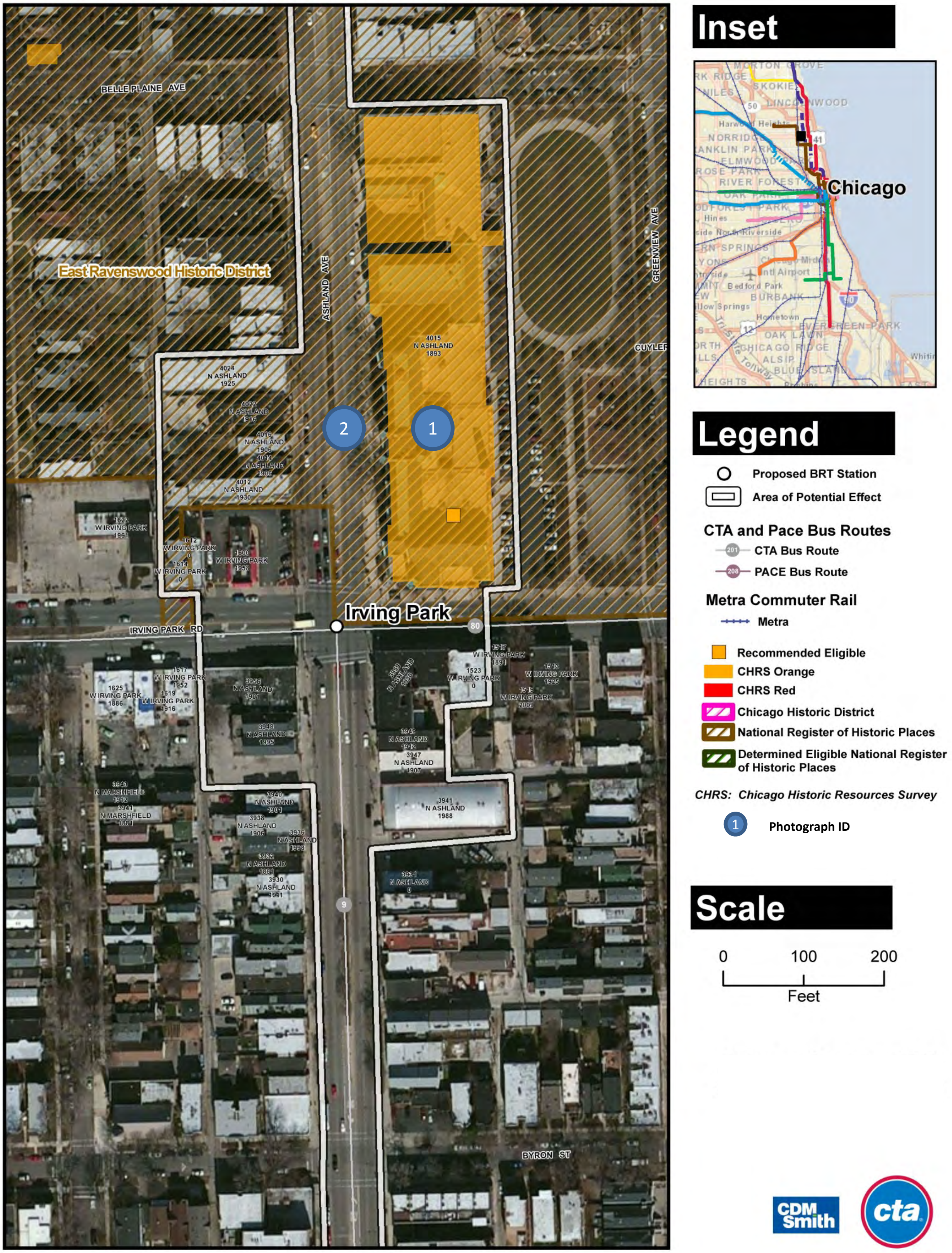


4015 North Ashland Avenue



East Ravenswood Historic District

Station Area 1: Irving Park Cont'd



Station Area 4: Belmont

The intersection is a typical urban environment full of activity and characterized by a combination of late 19th and early 20th century mixed-use, multi-family residential, and modern mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

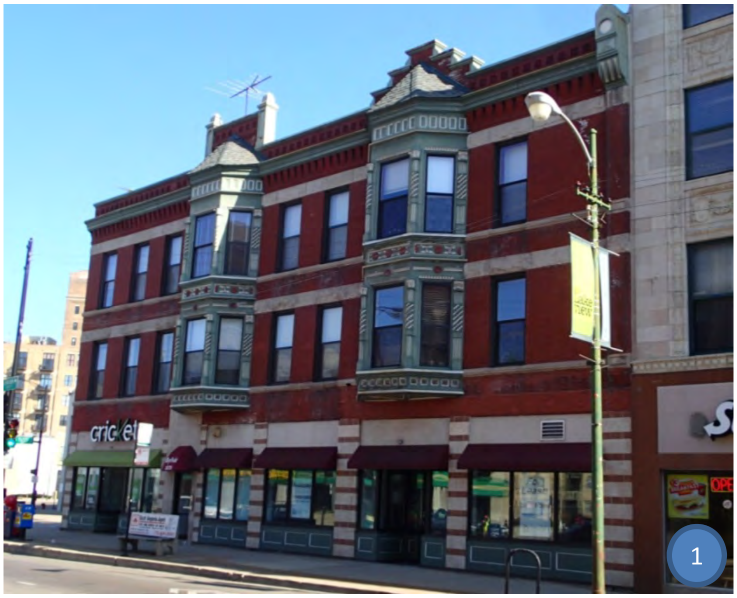
Property / Description	Date	CHRS	Landmark	NRHP
1. 3175 North Lincoln Avenue: Classical Revival Mixed Use Building	1890s	No	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

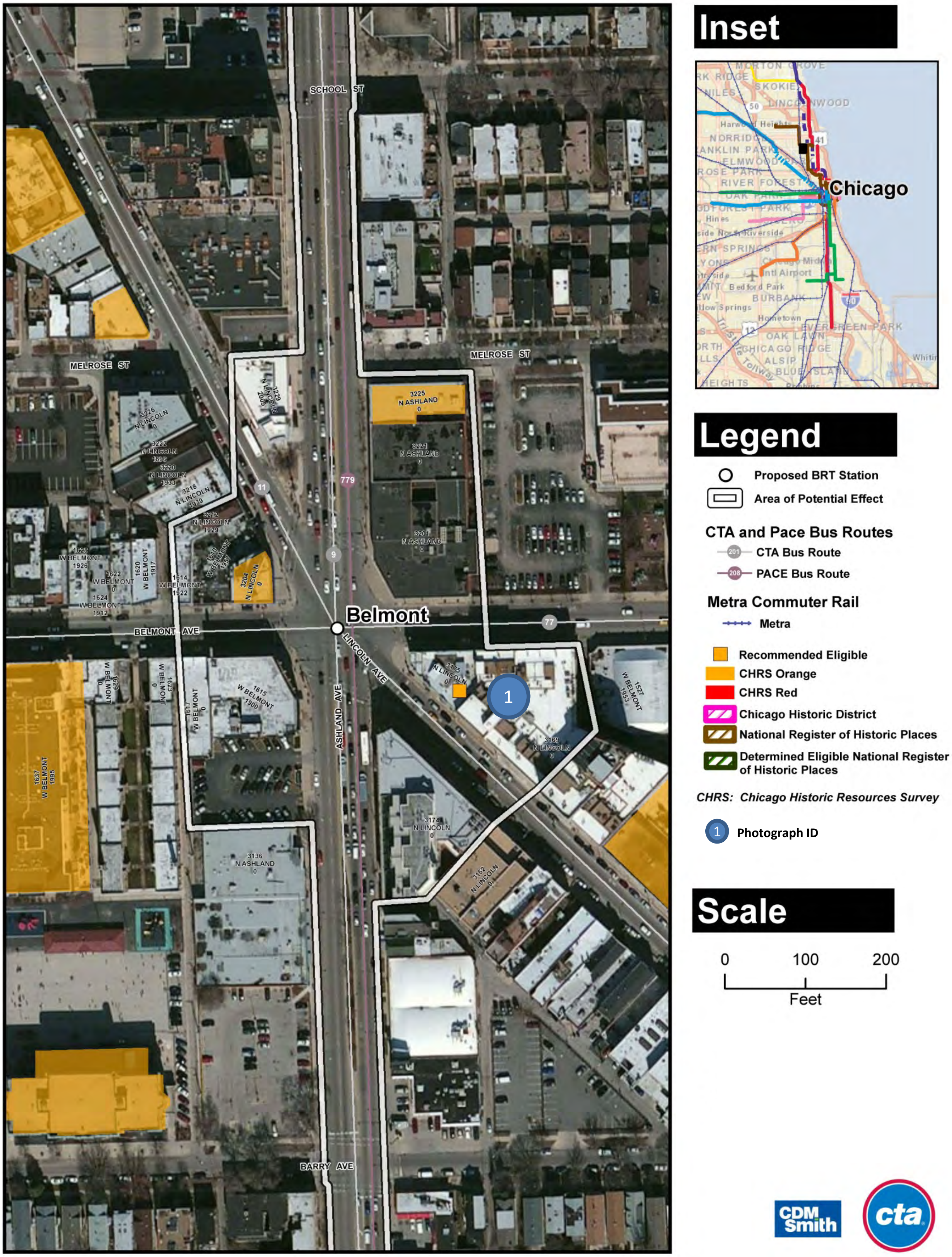
Property	No Adverse Effect
1. 3175 North Lincoln Avenue	- Median Station north or south of Belmont Ave - SB Curbside Station north or south of Belmont Ave - NB Curbside Station north or south of Belmont Ave

Photos:



3175 North Lincoln Avenue

Station Area 4: Belmont Cont'd



○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

CTA Bus Route

PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Station Area 9: Division

The intersection is a typical urban environment full of activity and characterized by a combination of late 19th and early 20th century mixed-use, multi-family residential, and modern mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

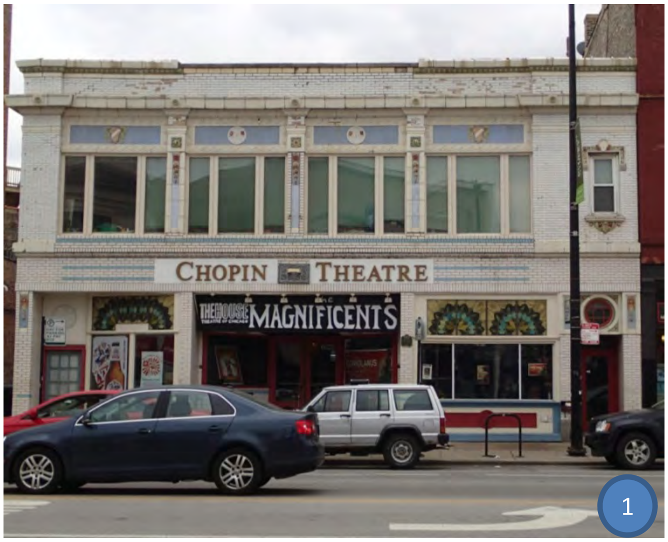
Property / Description	Date	CHRS	Landmark	NRHP
1. 1543 West Division Street: Classical Revival Mixed Use Building	1920s	No	No	Recommended Eligible
2. 1200 North Ashland Avenue: Classical Revival Mixed Use Bldg.	1920s	Orange	Yes	Listed

Effects Assessment:

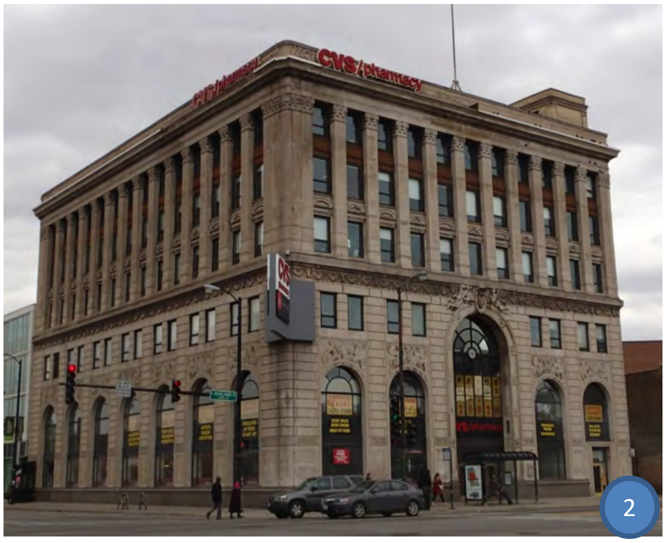
For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1543 West Division Street	- Median Station north or south of Division St - SB Curbside Station north or south of Division St - NB Curbside Station north or south of Division St
2. 1200 North Ashland Avenue	- Median Station north or south of Division St - SB Curbside Station south of Division St - NB Curbside Station north or south of Division St - SB Curbside Station north of Division St*
* Due to design of station being similar in size and scale to existing shelters along the corridor	

Photos:

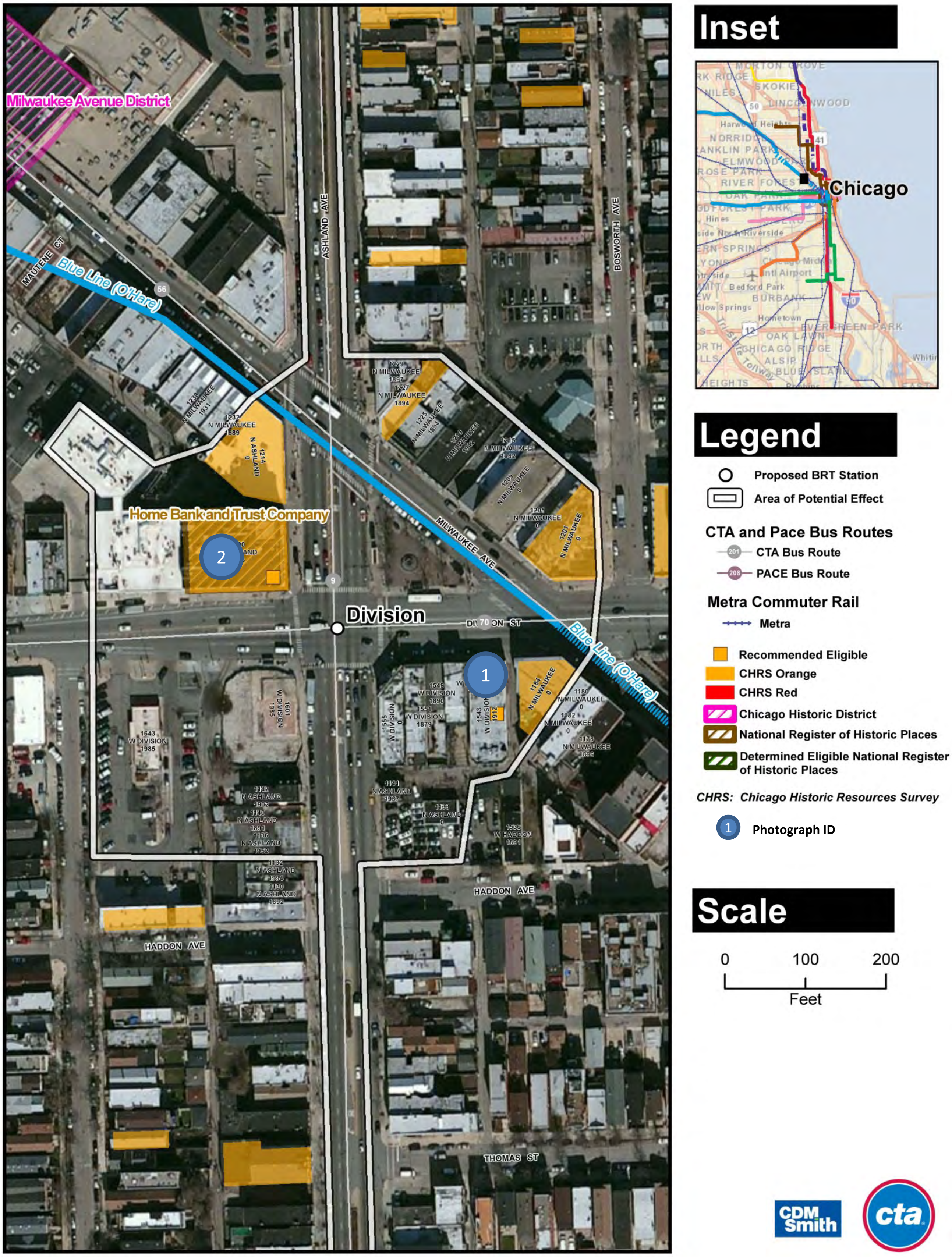


1543 West Division Street



1200 North Ashland Avenue

Station Area 9: Division Cont'd



Station Area 12: Lake

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, commercial, and recreational buildings as well as modern buildings. In addition the Lake Street train station is present. The buildings appear to be in good condition. The following NRHP historic resources were identified within this station area:

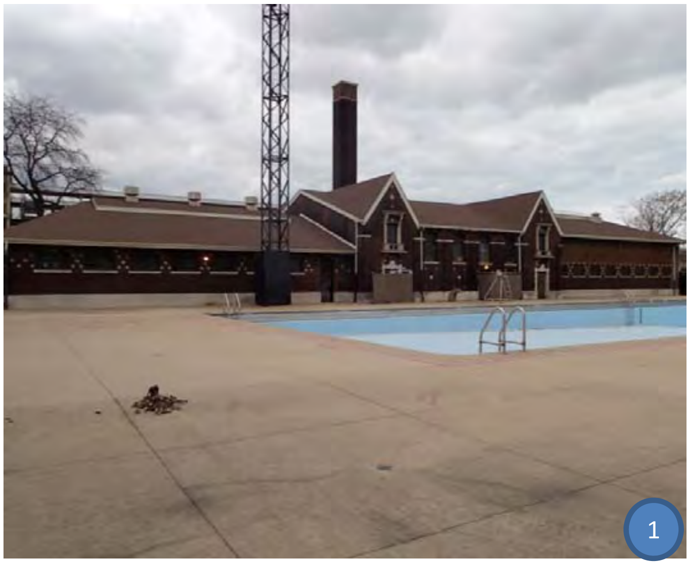
Property / Description	Date	CHRS	Landmark	NRHP
1. 1545 West Lake Street: Art Deco/Moderne Gymnasium	1900s	Orange	No	Recommended Eligible
2. Queen Anne Train Station: Lake Street at Ashland Avenue	1890s	Orange	No	Recommended Eligible
3. 238 North Ashland Avenue: Vernacular Commercial Building	1910s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1545 West Lake Street	- Median Station north or south of Lake St - SB Curbside Station north or south of Lake St - NB Curbside Station north or south of Lake St
2. Queen Anne Train Station	- Median Station north or south of Lake St - SB Curbside Station north or south of Lake St - NB Curbside Station north or south of Lake St
3. 238 North Ashland Avenue	- Median Station north or south of Lake St - SB Curbside Station north or south of Lake St - NB Curbside Station north or south of Lake St

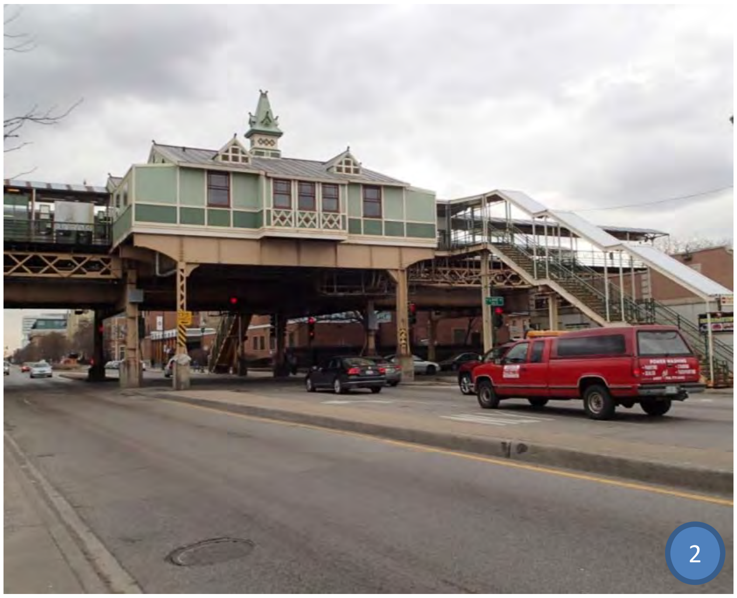
Photos (Cont'd on Next Page):



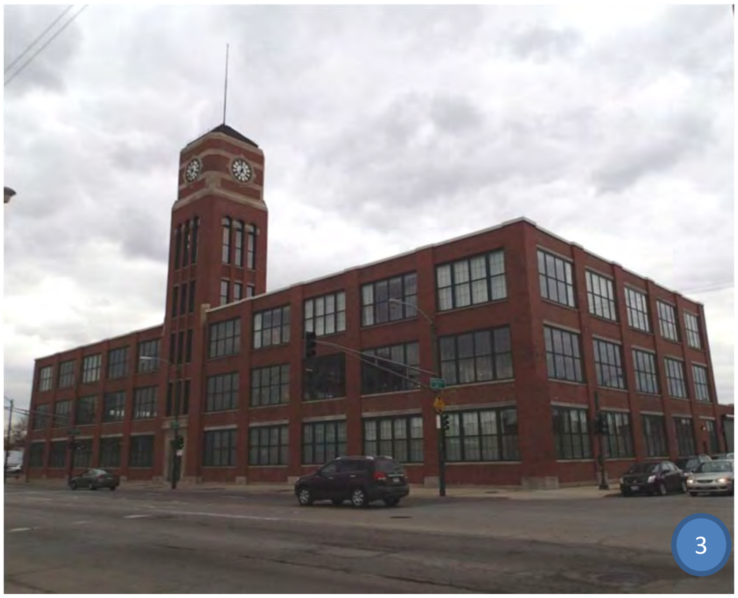
1545 West Lake Street

Station Area 12: Lake Cont'd

Photos Cont'd:

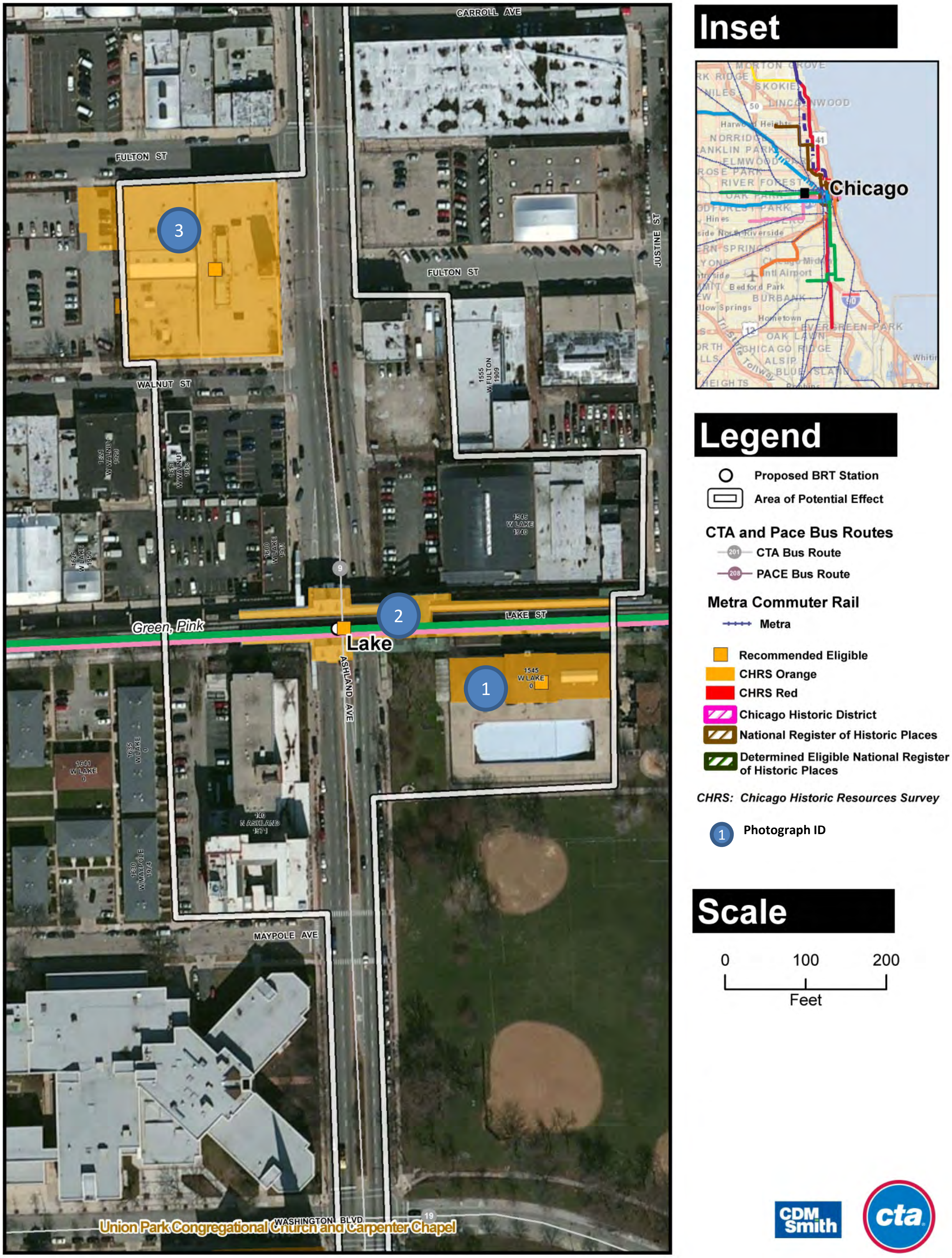


Queen Anne Train Station



238 North Ashland Avenue

Station Area 12: Lake Cont'd



Station Area 13: Madison

The intersection has experienced a slight downturn in activity and development as it is characterized by a combination of early 20th century mixed-use buildings and modern buildings along with vacant lots. The buildings appear to be in good condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 1521 West Warren Boulevard: Art Deco/Moderne Hotel	1920s	Orange	Yes	Listed

Effects Assessment:

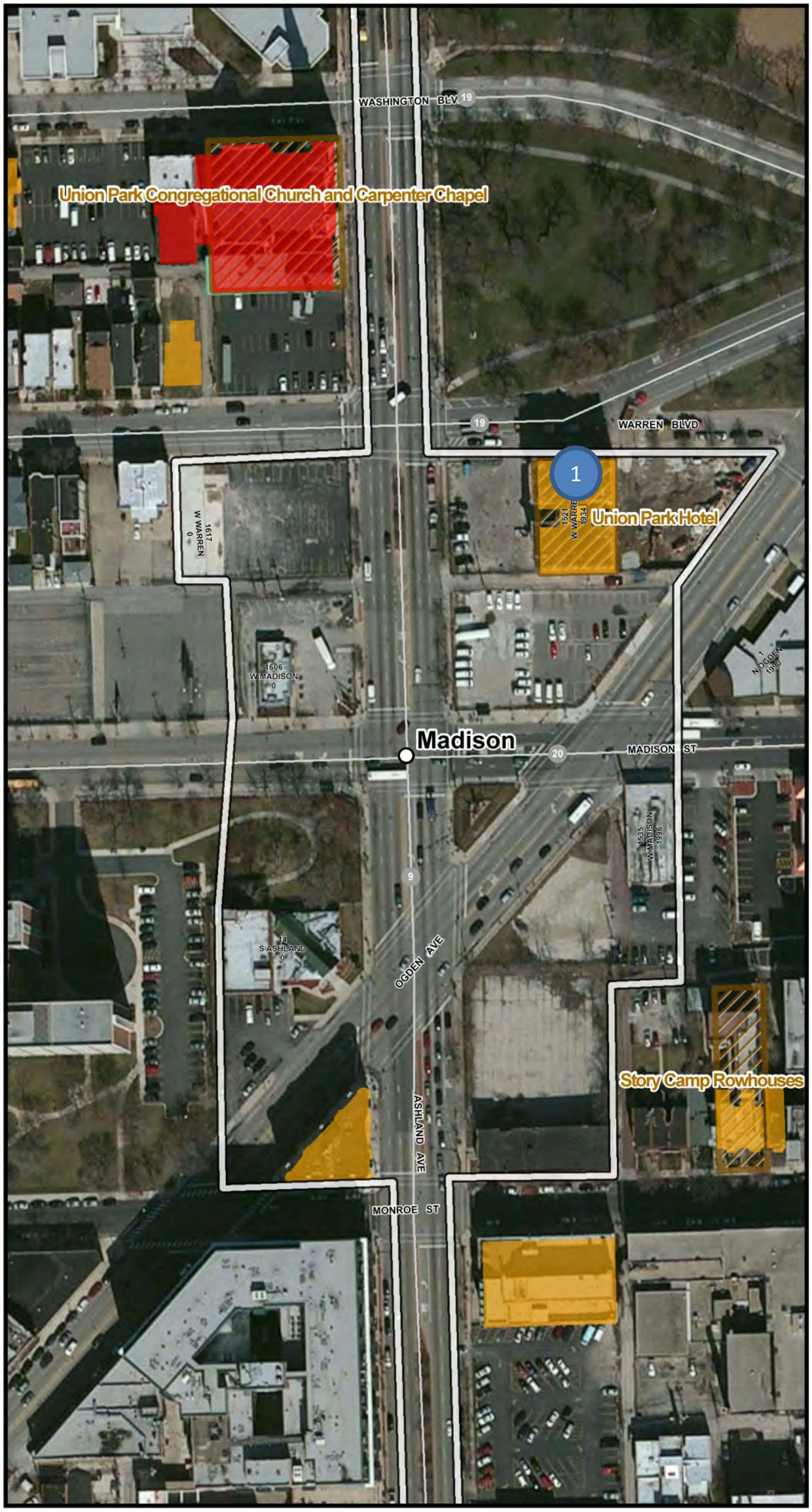
For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1521 West Warren Boulevard	- Median Station north or south of Madison St - SB Curbside Station north or south of Madison St - NB Curbside Station north or south of Madison St

Photos:

1521 West Warren Boulevard

Station Area 13: Madison Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 14: Jackson

The intersection falls within the West Jackson Boulevard Historic District and contains late 19th and early 20th century mixed-use, commercial, and multi-family residences, as well as modern multi-family residences and commercial buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 315 South Ashland Avenue: Romanesque Revival Residential Bldg.	1890s	Orange	No	Recommended Eligible; Contributing element within the West Jackson Boulevard Historic District
2. 1539 West Jackson Boulevard: Romanesque Revival Residential Bldg.	1889	Orange	Yes	Recommended Eligible; Contributing element within the West Jackson Boulevard Historic District
3. 236-238 South Ashland Avenue: Italianate Mixed Use Building	1889	Orange	No	Recommended Eligible
4. West Jackson Boulevard HD: a collection of 40 buildings on 8.5 acres along Jackson Blvd	1876-1890	n/a	Local District	Listed

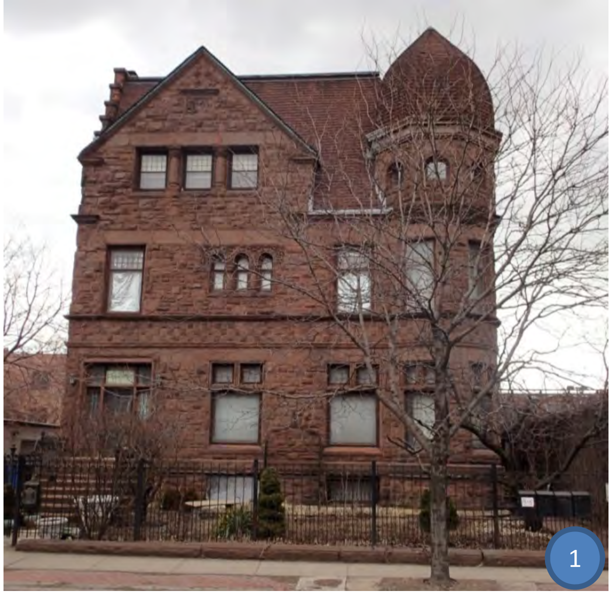
Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

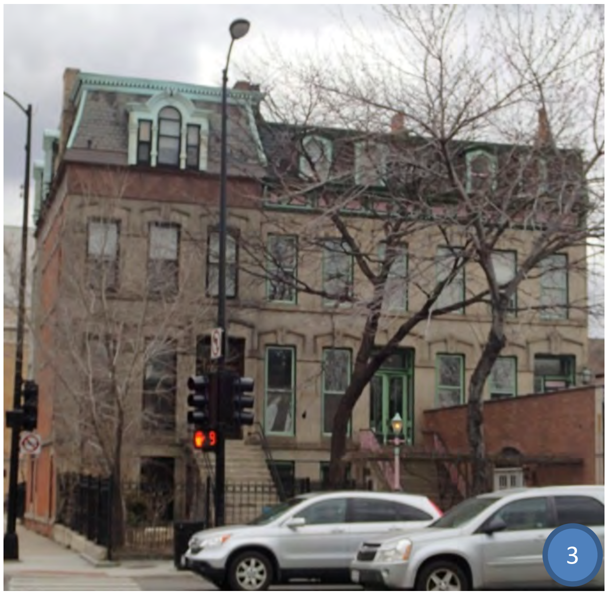
Property	No Adverse Effect
1. 315 South Ashland Avenue	- Median Station north or south of Jackson Blvd - SB Curbside Station north or south of Jackson Blvd - NB Curbside Station north of Jackson Blvd - NB Curbside Station south of Jackson Blvd*
2. 1539 West Jackson Boulevard	- Median Station north or south of Jackson Blvd - SB Curbside Station north or south of Jackson Blvd - NB Curbside Station north or south of Jackson Blvd
3. 236-238 South Ashland Avenue	- Median Station north or south of Jackson Blvd - SB Curbside Station north or south of Jackson Blvd - NB Curbside Station north or south of Jackson Blvd
4. West Jackson Boulevard Historic District	- SB Curbside Station north or south of Jackson Blvd -Median Station or NB Curbside Stations**
* Due to design of station being similar in size and scale to existing shelters along the corridor ** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor	

Station Area 14: Jackson Cont’d

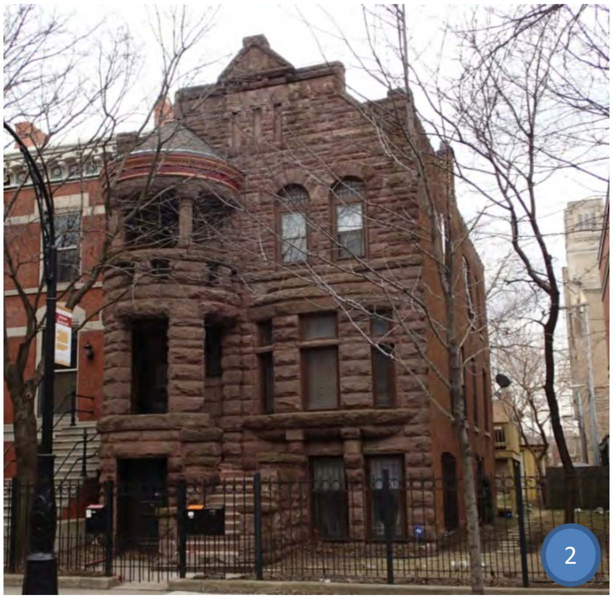
Photos:



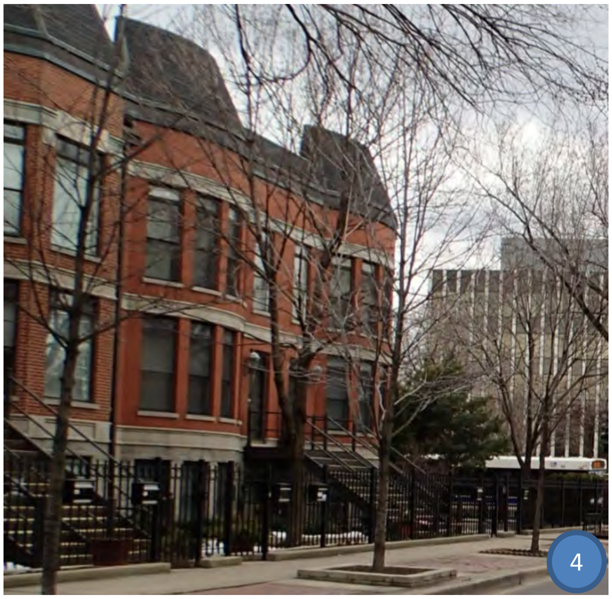
315 South Ashland Avenue



236-238 South Ashland Avenue

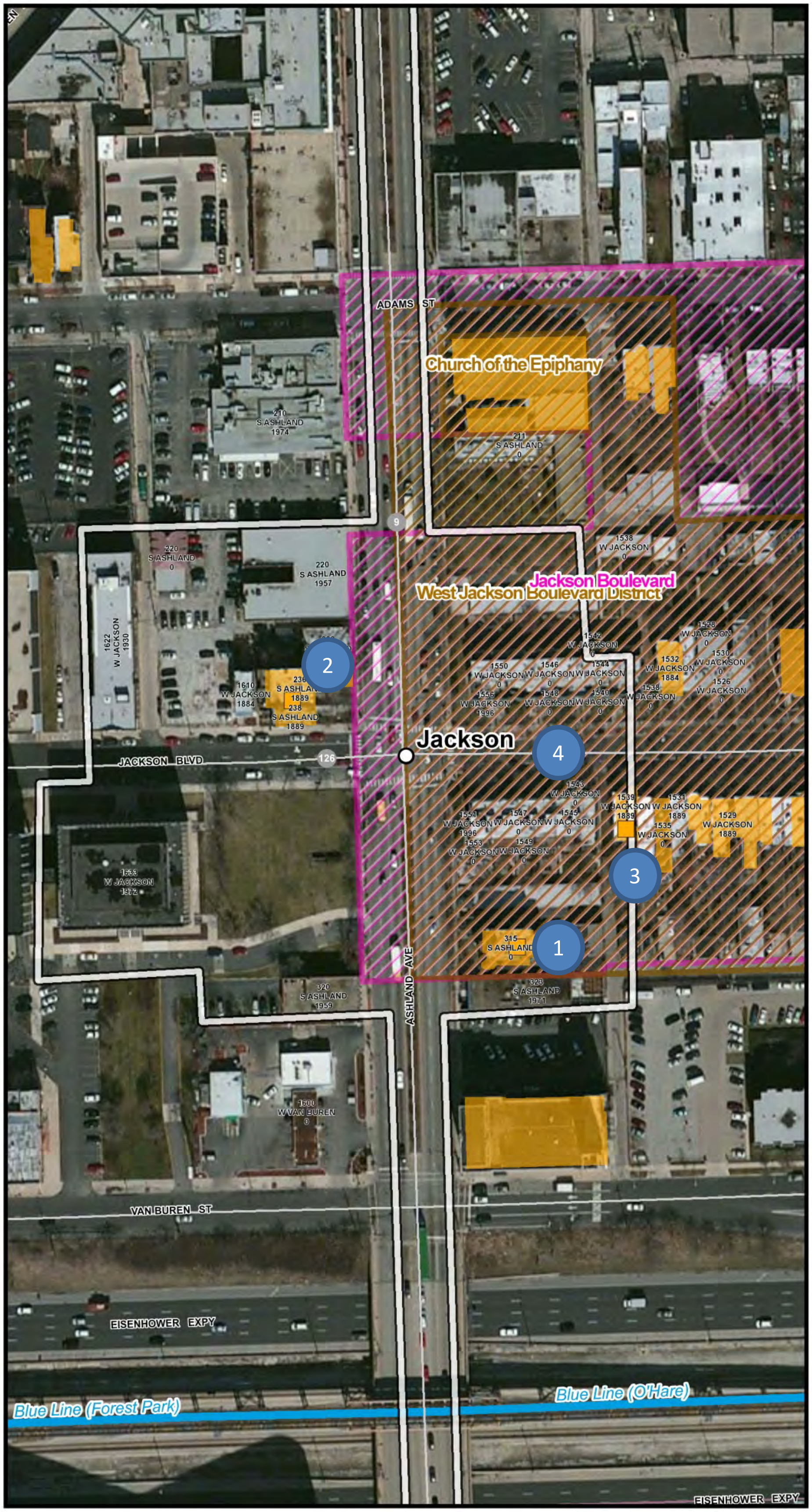


1539 West Jackson Boulevard



West Jackson Historic District

Station Area 14: Jackson Cont’d



Inset

Legend

- ○ Proposed BRT Station
- ▭ Area of Potential Effect

CTA and Pace Bus Routes

- 201 CTA Bus Route
- 208 PACE Bus Route

Metra Commuter Rail

- Metra

- 🟧 Recommended Eligible
- 🟧 CHRS Orange
- 🟥 CHRS Red
- ▨ Chicago Historic District
- ▨ National Register of Historic Places
- ▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

- ① Photograph ID

Scale

0 100 200

Feet

Station Area 16: Polk

The intersection is a typical urban environment full of activity and characterized by a large mid-20th century hospital, modern buildings, and associated parking lots, as well as a religious facility. The buildings appear to be in excellent condition. The following NRHP historic resources were identified within this station area:

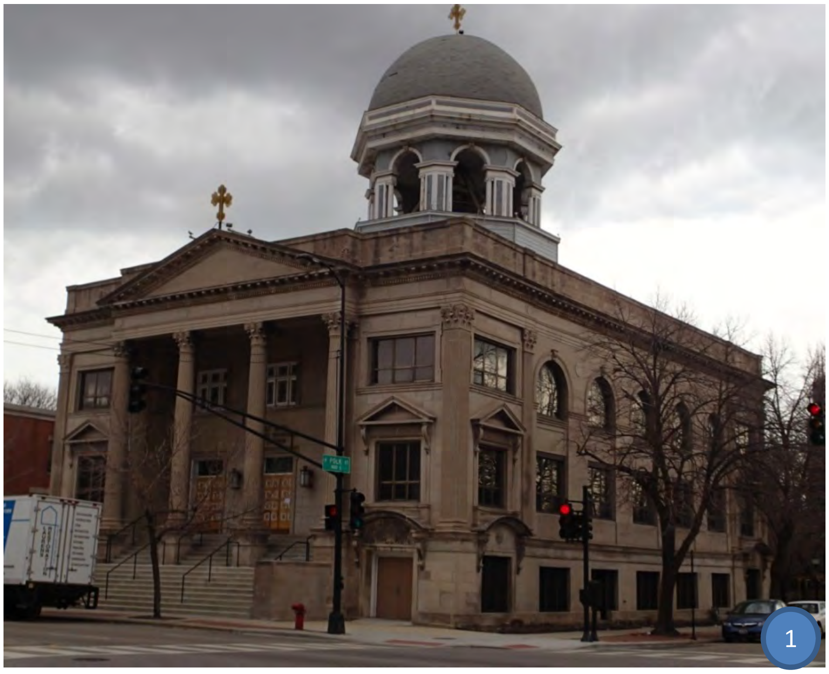
Property / Description	Date	CHRS	Landmark	NRHP
1. 733 South Ashland Avenue: Classical Revival Church	1910s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

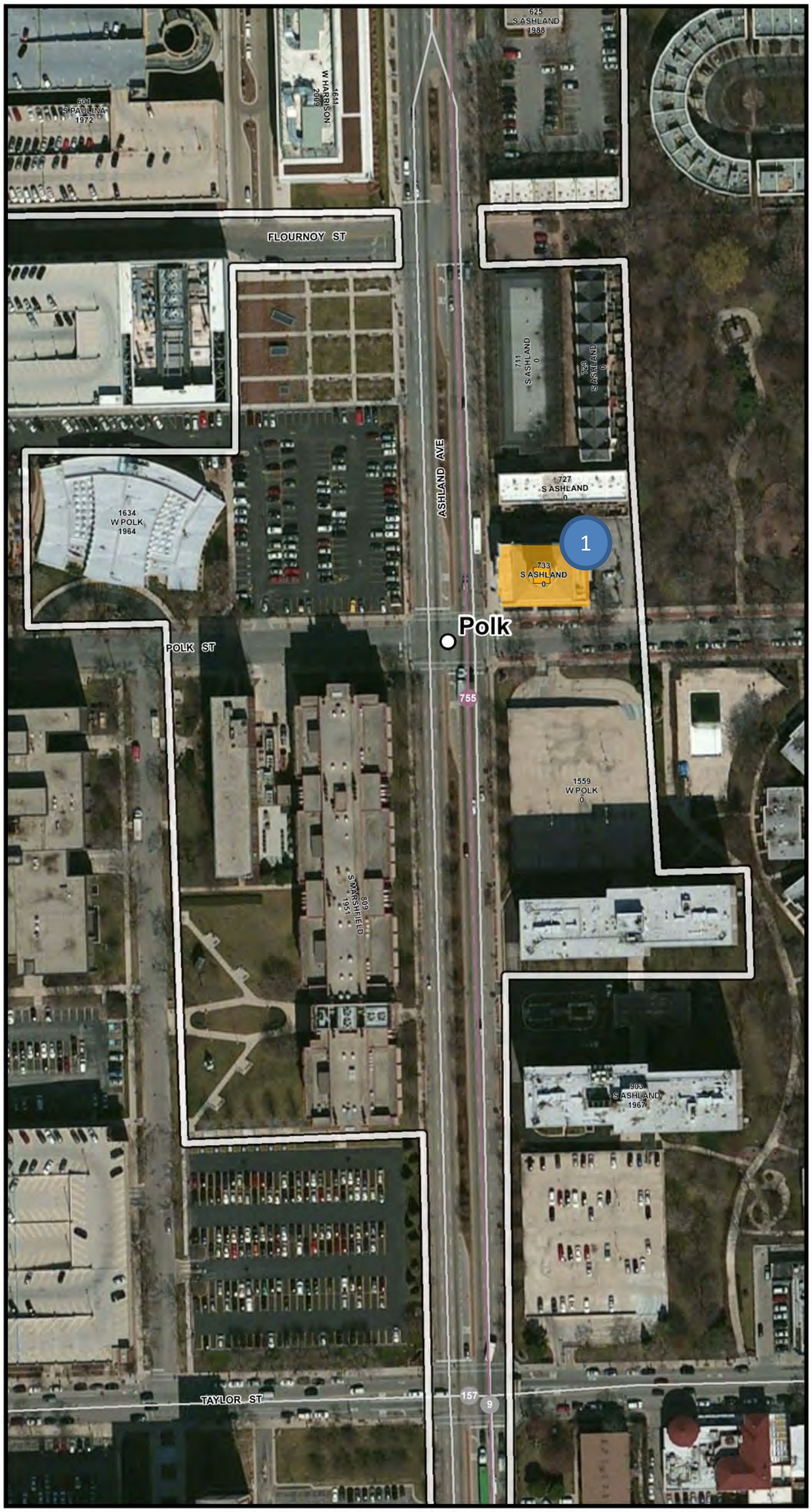
Property	No Adverse Effect
1. 733 South Ashland Avenue	- Median Station north or south of Polk St - SB Curbside Station north or south of Polk St - NB Curbside Station south of Polk St - NB Curbside Station north of Polk St*
*** Due to design of station being similar in size and scale to existing shelters along the corridor**	

Photos:



733 South Ashland Avenue

Station Area 16: Polk Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

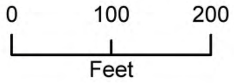
▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale



Station Area 17: Roosevelt

The intersection is a typical urban environment full of activity and characterized by a majority of modern mixed-use commercial buildings, including a gas station and apartments. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

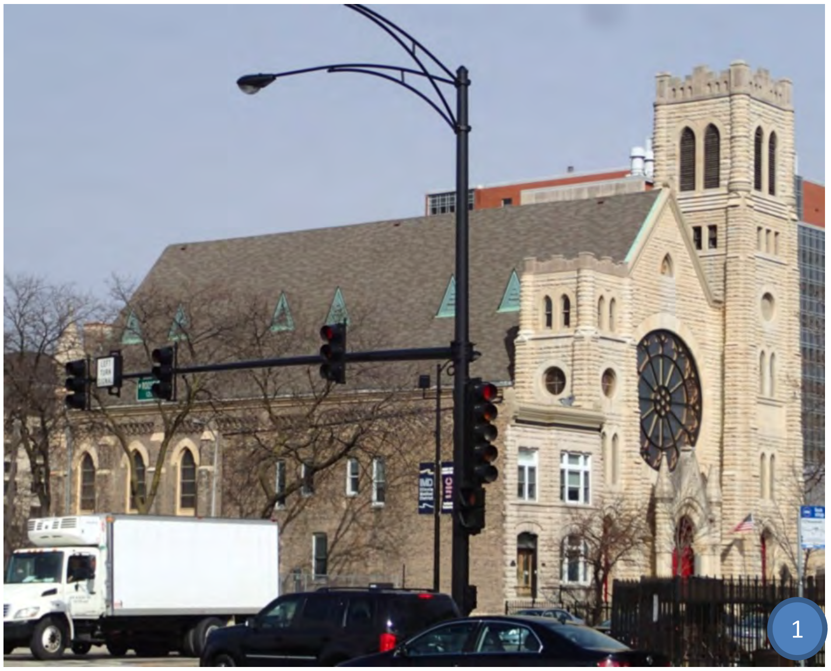
Property / Description	Date	CHRS	Landmark	NRHP
1. 1132 South Ashland Avenue: Gothic Revival Church	1880s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

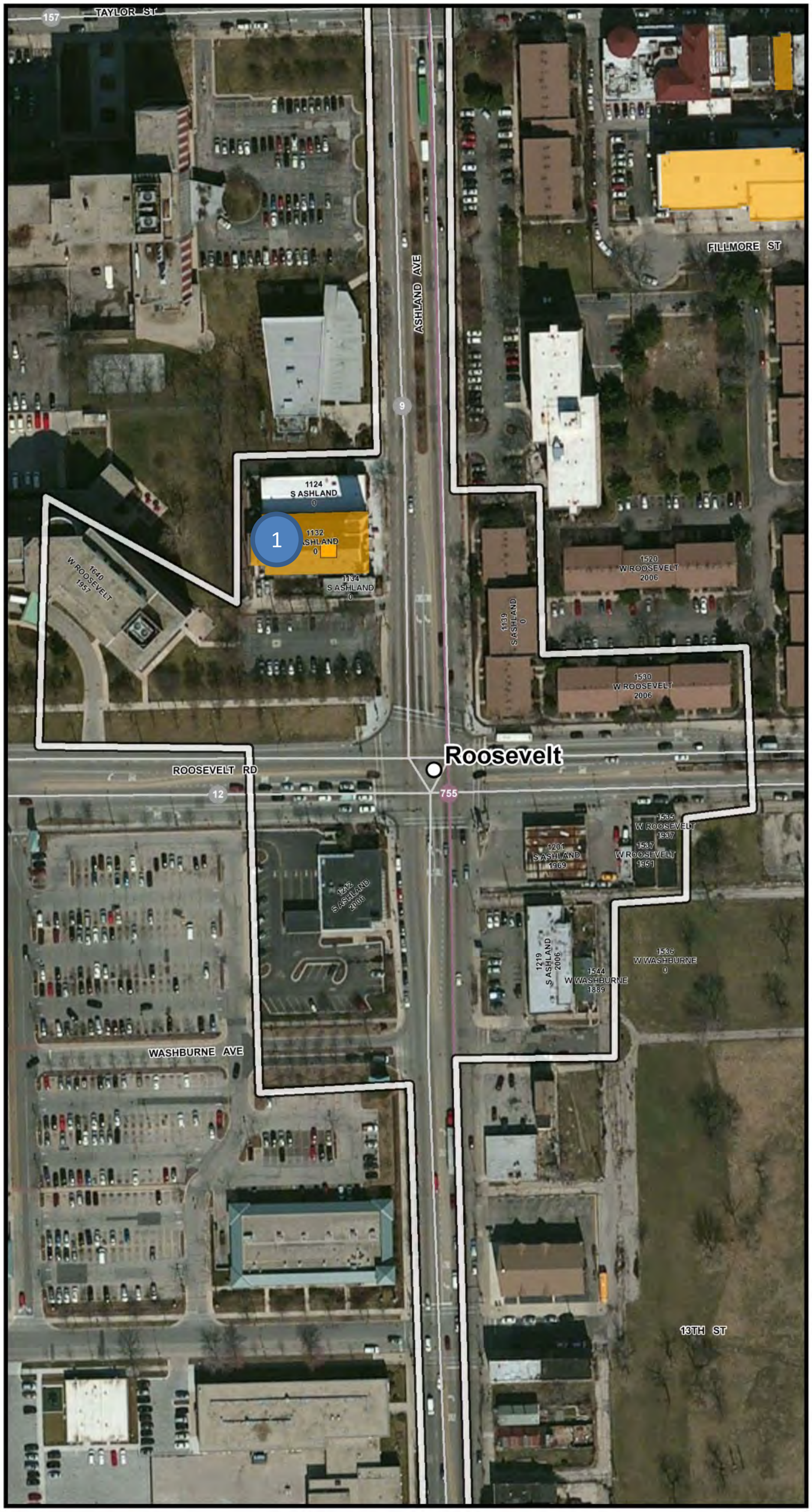
Property	No Adverse Effect
1. 1132 South Ashland Avenue	- Median Station north or south of Roosevelt Rd - SB Curbside Station north or south of Roosevelt Rd - NB Curbside Station north or south of Roosevelt Rd

Photos:



1132 South Ashland Avenue

Station Area 17: Roosevelt Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 18: 18th

The intersection falls within the Pilsen Historic District and contains late 19th and early 20th century mixed-use, commercial, and multi-family residences. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 1812 South Ashland Avenue: Renaissance Revival Mixed Use Bldg.	1890s	Orange	No	Recommended Eligible; Contributing element within the Pilsen Historic District
2. Pilsen Historic District : a collection of over 4,400 residential, commercial, and industrial buildings roughly bounded by 16th Street, Cermak Road, Halsted Street, and Western Avenue.	1871-1956	n/a	n/a	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

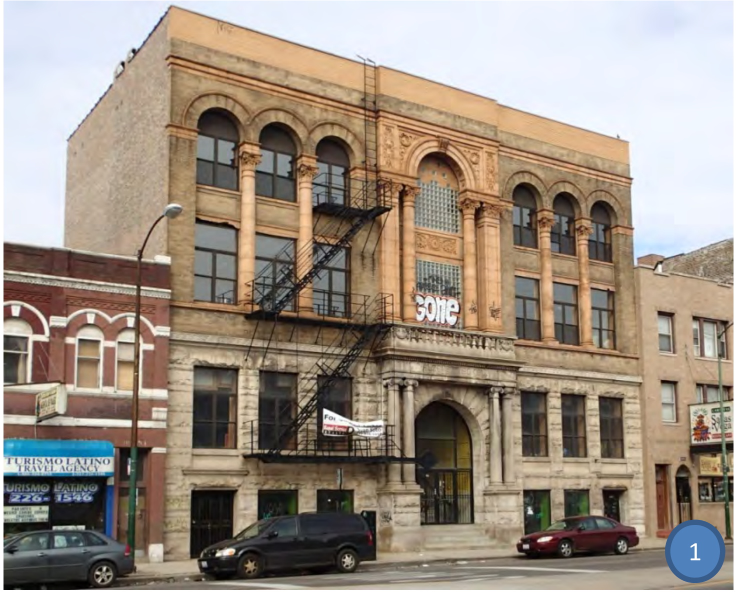
Property	No Adverse Effect
1. 1812 South Ashland Avenue	- Median Station north or south of 18th St - SB Curbside Station north of 18th St - NB Curbside Station north or south of 18th St - SB Curbside Station south of 18th St*
2. Pilsen Historic District	- All six possible Station locations**
* Due to design of station being similar in size and scale to existing shelters along the corridor ** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor	

Photos:

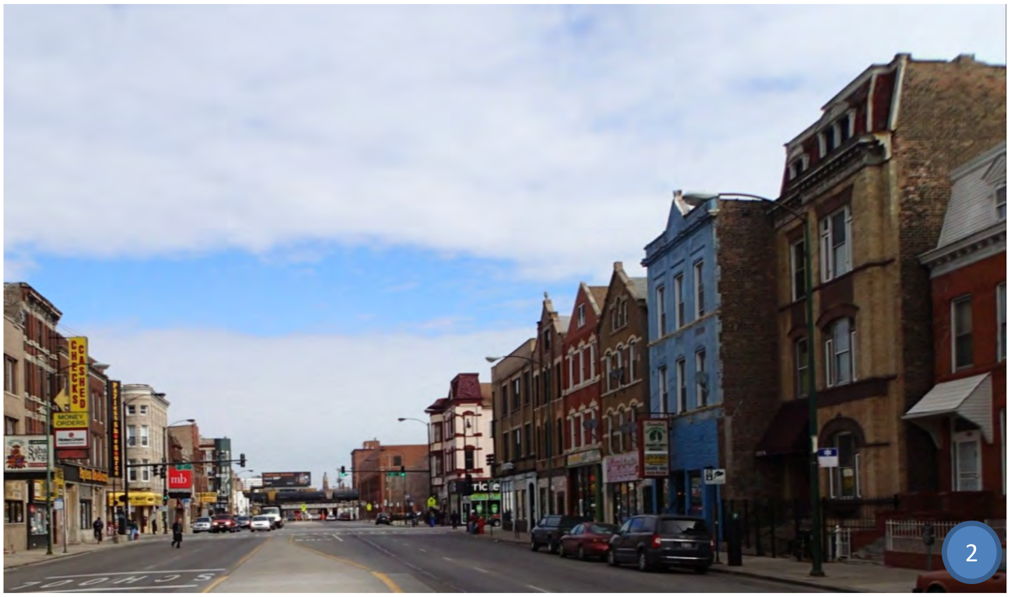
See Next Page

Station Area 18: 18th Cont’d

Photos:

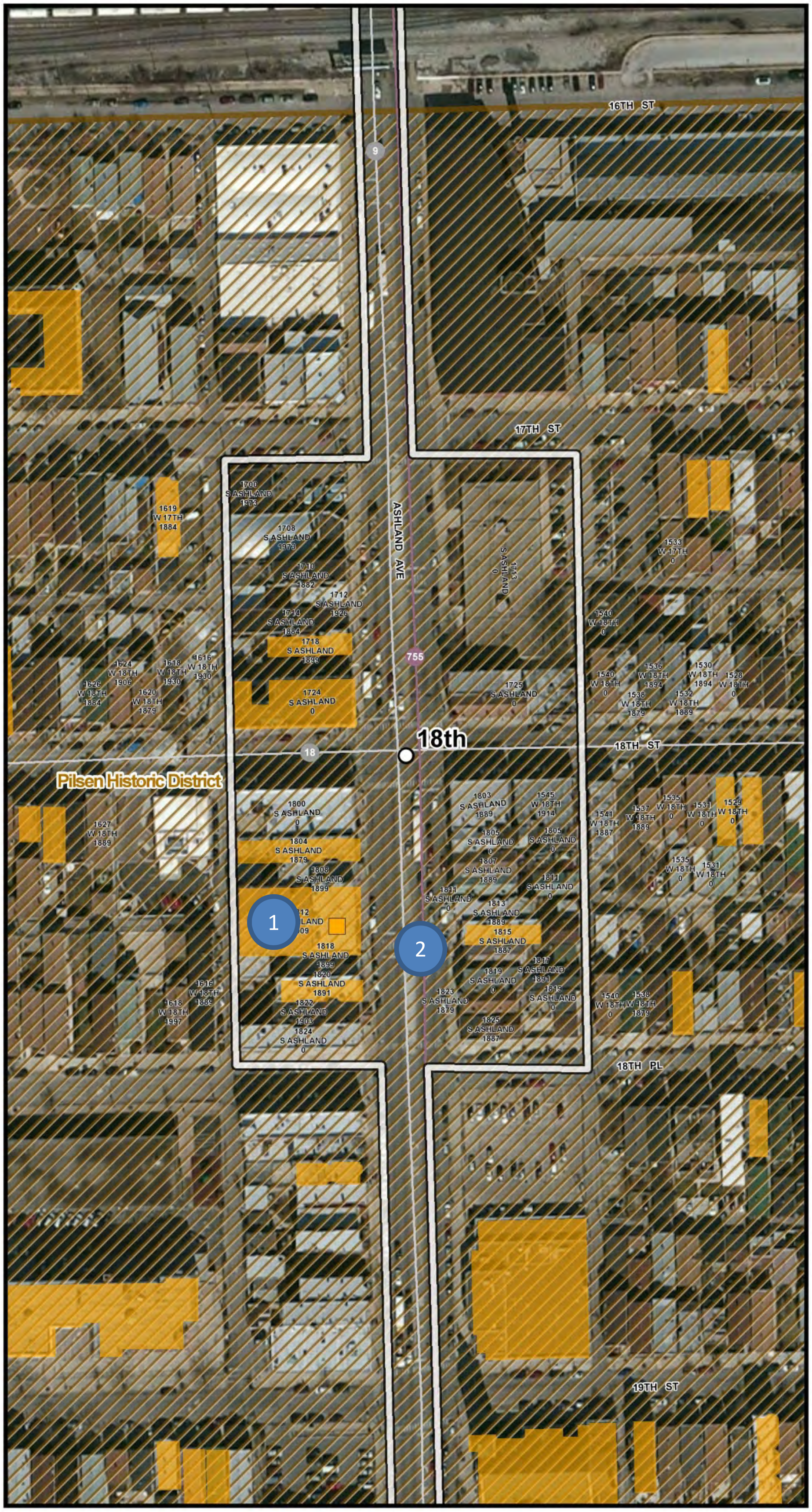


1812 South Ashland Avenue



Pilsen Historic District

Station Area 18: 18th Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

● CTA Bus Route

● PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

Station Area 19: Blue Island

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, commercial, and modern buildings including a gas station and school. The Pilsen Historic District begins on the north side of the intersection. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. Pilsen Historic District : a collection of over 4,400 residential, commercial, and industrial buildings roughly bounded by 16th Street, Cermak Road, Halsted Street, and Western Avenue.	1871-1956	n/a	n/a	Listed

Effects Assessment:

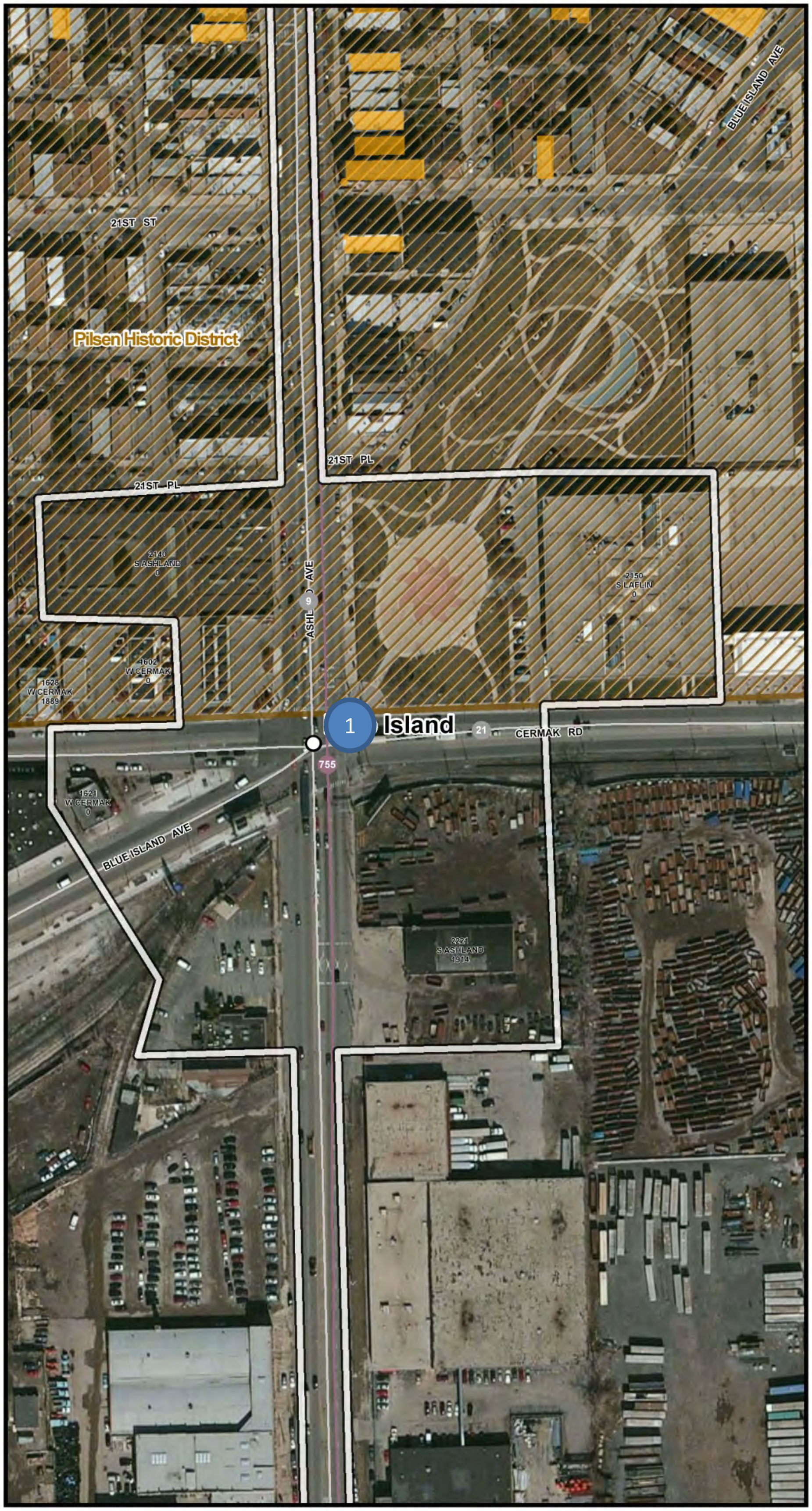
For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. Pilsen Historic District	- Median Station north or south of Cermak Rd - SB Curbside Station north or south of Cermak Rd - NB Curbside Station north or south of Cermak Rd

Photos:

Pilsen Historic District

Station Area 19: Blue Island Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

- 201 CTA Bus Route
- 208 PACE Bus Route

Metra Commuter Rail

- Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 21: 35th

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use, industrial, and modern buildings including a gas station and retail. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

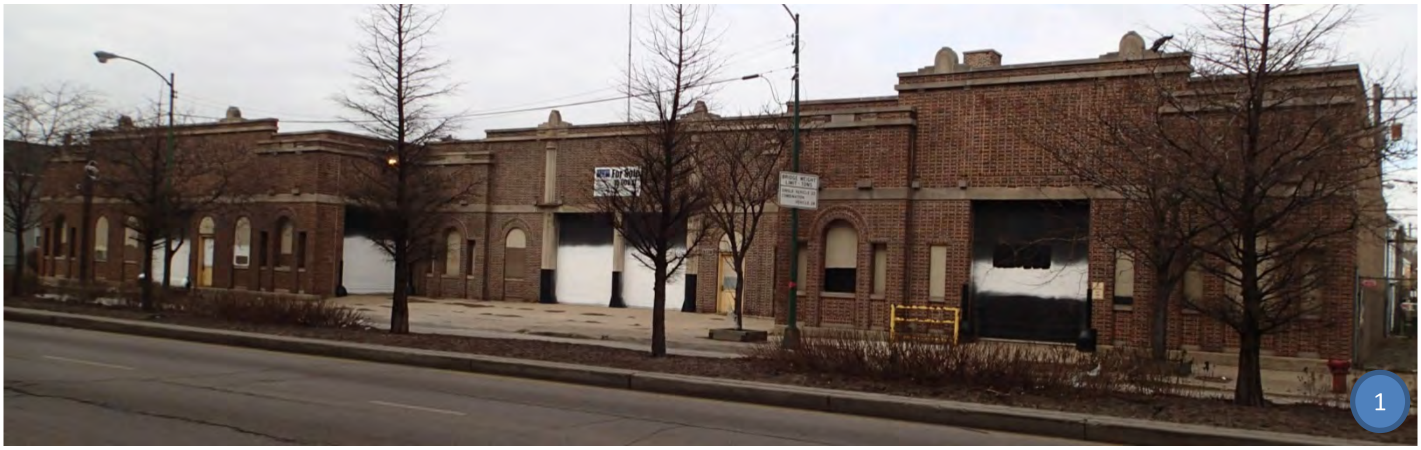
Property / Description	Date	CHRS	Landmark	NRHP
1. 3538 South Ashland Avenue: Industrial Building	1910s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

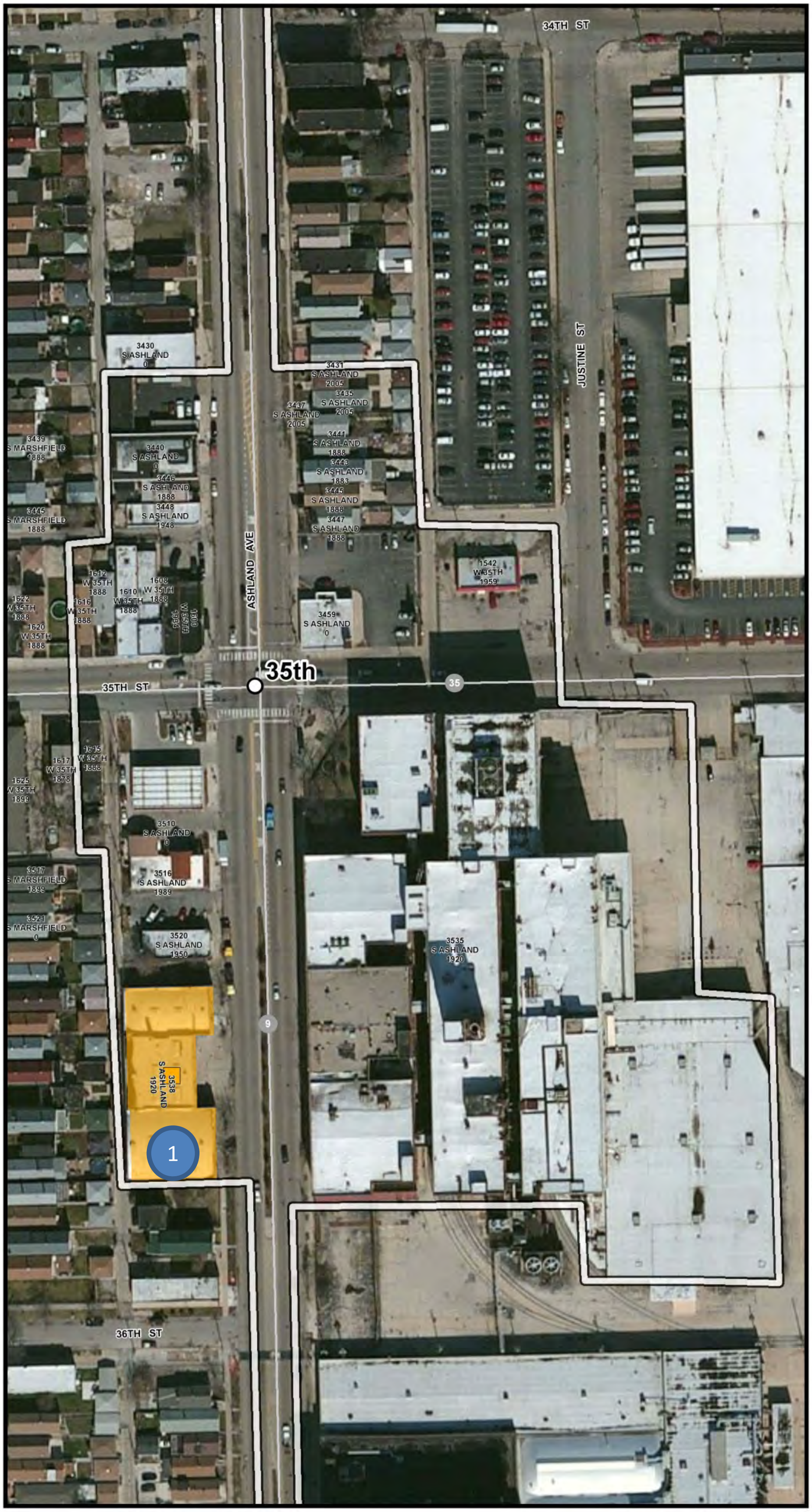
Property	No Adverse Effect
1. 3538 South Ashland Avenue	- Median Station north or south of 35th St - SB Curbside Station north or south of 35th St - NB Curbside Station north or south of 35th St

Photos:



3538 South Ashland Avenue

Station Area 21: 35th Cont'd



Inset

Legend

- ○ Proposed BRT Station
- ▭ Area of Potential Effect

CTA and Pace Bus Routes

- 201 CTA Bus Route
- 208 PACE Bus Route

Metra Commuter Rail

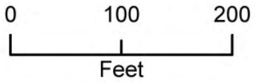
- Metra

- 🟧 Recommended Eligible
- 🟧 CHRS Orange
- 🟥 CHRS Red
- ▨ Chicago Historic District
- ▨ National Register of Historic Places
- ▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

- ① Photograph ID

Scale



Station Area 24: 47th

The intersection is a typical urban environment full of activity and characterized by a combination of early 20th century mixed-use/retail and modern buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

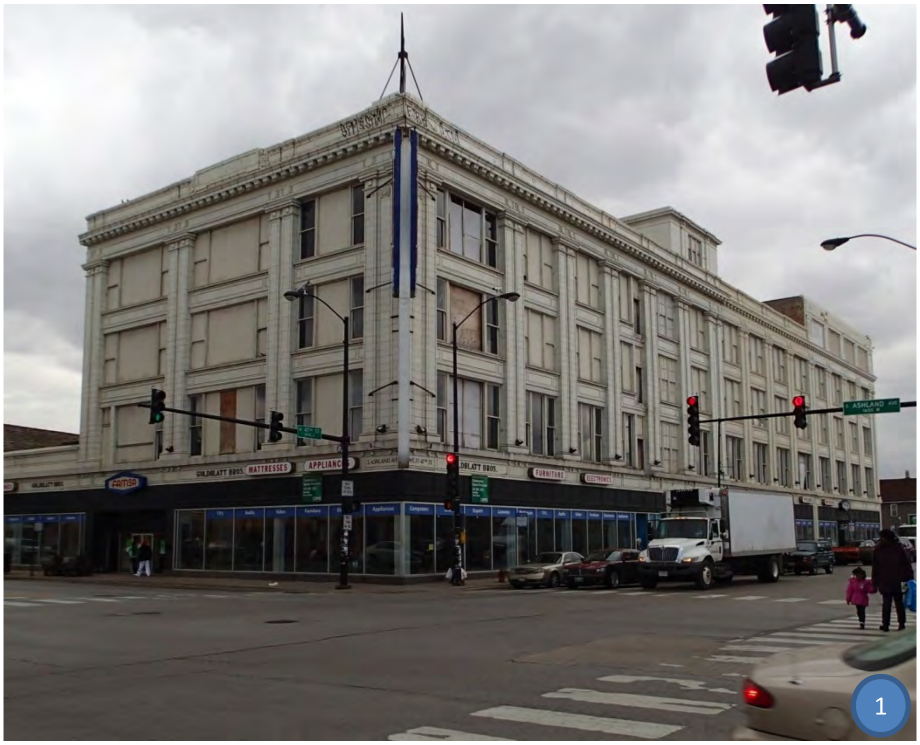
Property / Description	Date	CHRS	Landmark	NRHP
1. 4700 South Ashland Avenue: Goldblatt Brothers Department Store	1910s	Orange	Yes	Listed

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

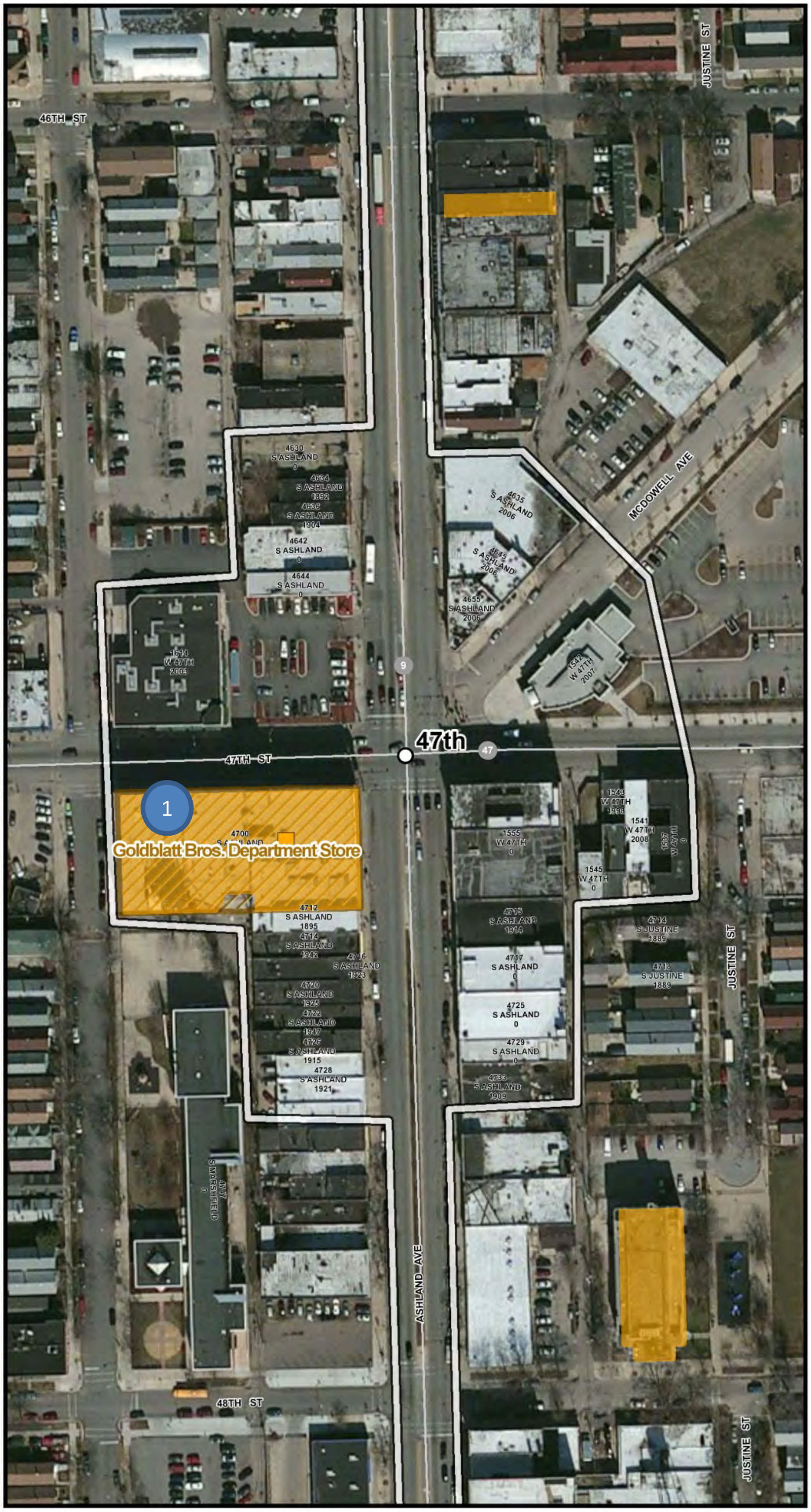
Property	No Adverse Effect
1. 4700 South Ashland Avenue	- Median Station north or south of 47th St - SB Curbside Station north of 47th St - NB Curbside Station north or south of 47th St - SB Curbside Station south of 47th St*
* Due to design of station being similar in size and scale to existing shelters along the corridor	

Photos:



4700 South Ashland Avenue

Station Area 24: 47th Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

CDM Smith

cta

Station Area 25: 51st

The intersection has experienced a downturn in activity and development as it is characterized by several vacant lots and a combination of early 20th century mixed-use and modern buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

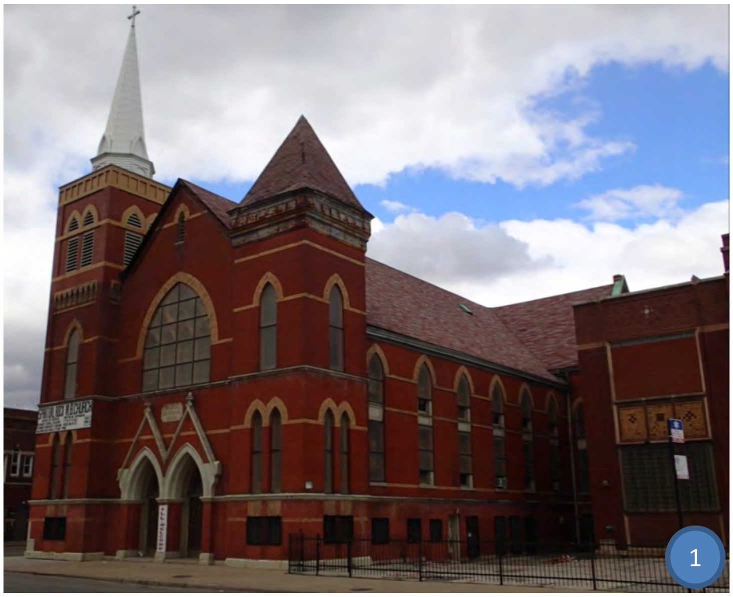
Property / Description	Date	CHRS	Landmark	NRHP
1. 1624 West 51st Street: Gothic Revival Church	1900s	Orange	No	Recommended Eligible
2. 1614 West 51st Street: Classical Revival School	1924	No	No	Recommended Eligible
3. 5043 South Ashland Avenue: Classical Revival Mixed Use Building	1893	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. 1624 West 51st Street	- Median Station north or south of 51st St - SB Curbside Station north or south of 51st St - NB Curbside Station north or south of 51st St
2. 1614 West 51st Street	- Median Station north or south of 51st St - SB Curbside Station north or south of 51st St - NB Curbside Station north or south of 51st St
3. 5043 South Ashland Avenue	- Median Station north or south of 51st St - SB Curbside Station north or south of 51st St - NB Curbside Station north or south of 51st St

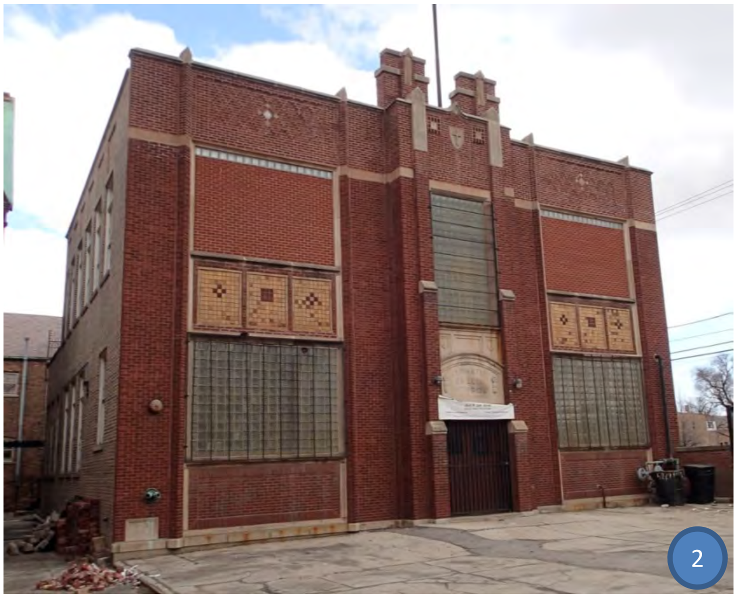
Photos (Cont'd on Next Page):



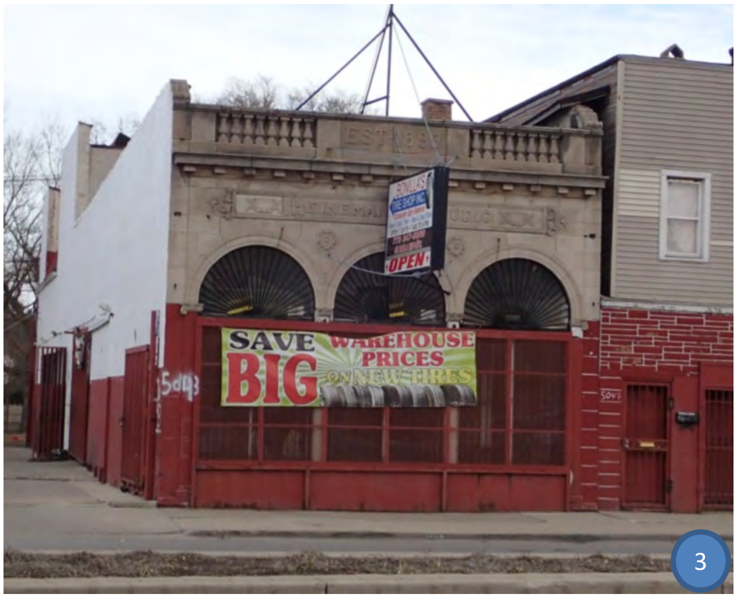
1624 West 51st Street

Station Area 25: 51st Cont'd

Photos Cont'd:

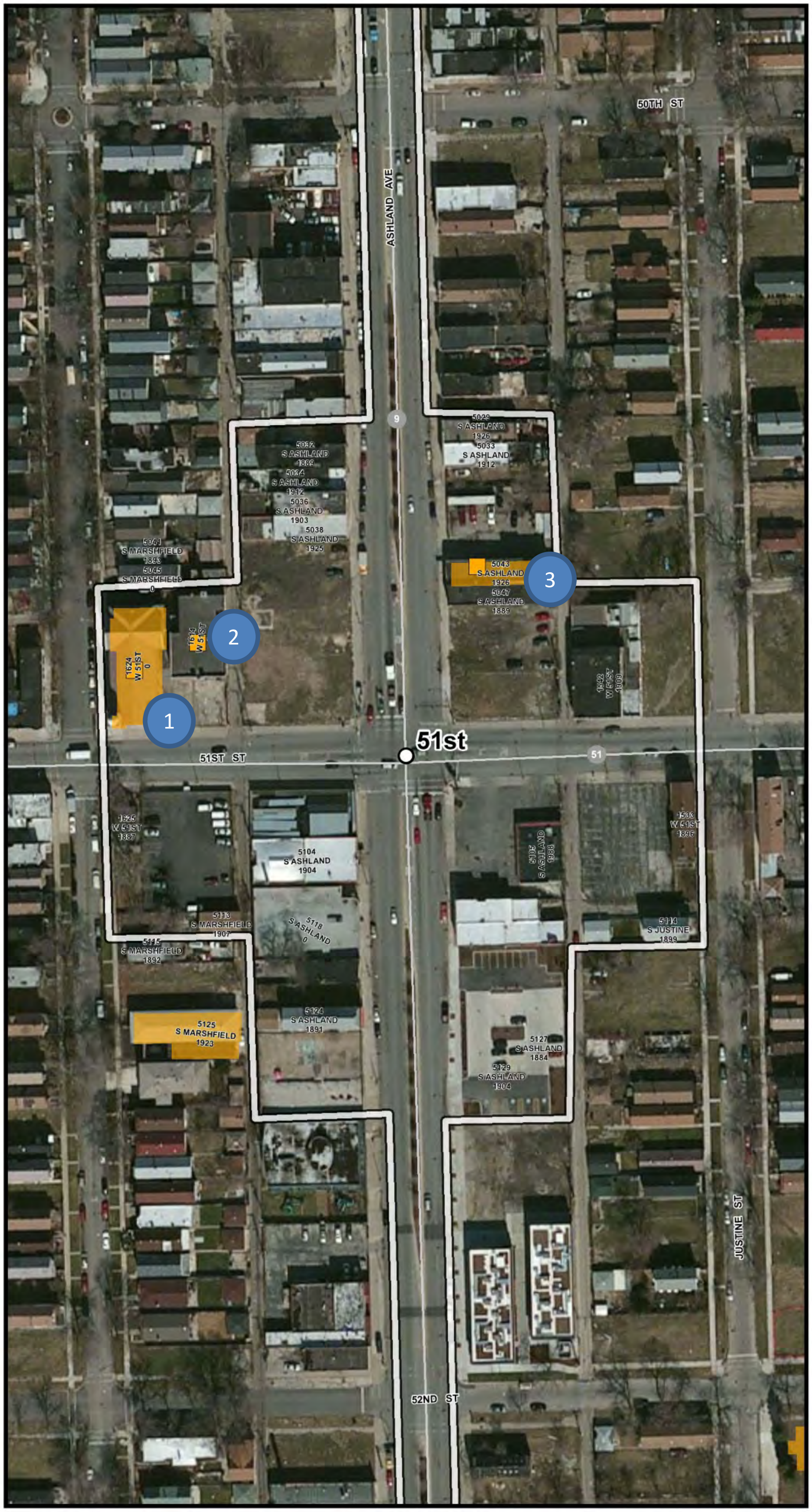


1614 West 51st Street



5043 South Ashland Avenue

Station Area 25: 51st Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

+-+-+ Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

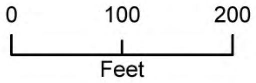
▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale



Station Area 26: Garfield

The intersection is a typical urban environment full of activity and characterized by several modern mixed-use and commercial buildings including retail, fast food and a gas station along with late 20th century multi-residential buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. Chicago Park Boulevard System Historic District	1896-1964	n/a	n/a	Determined Eligible

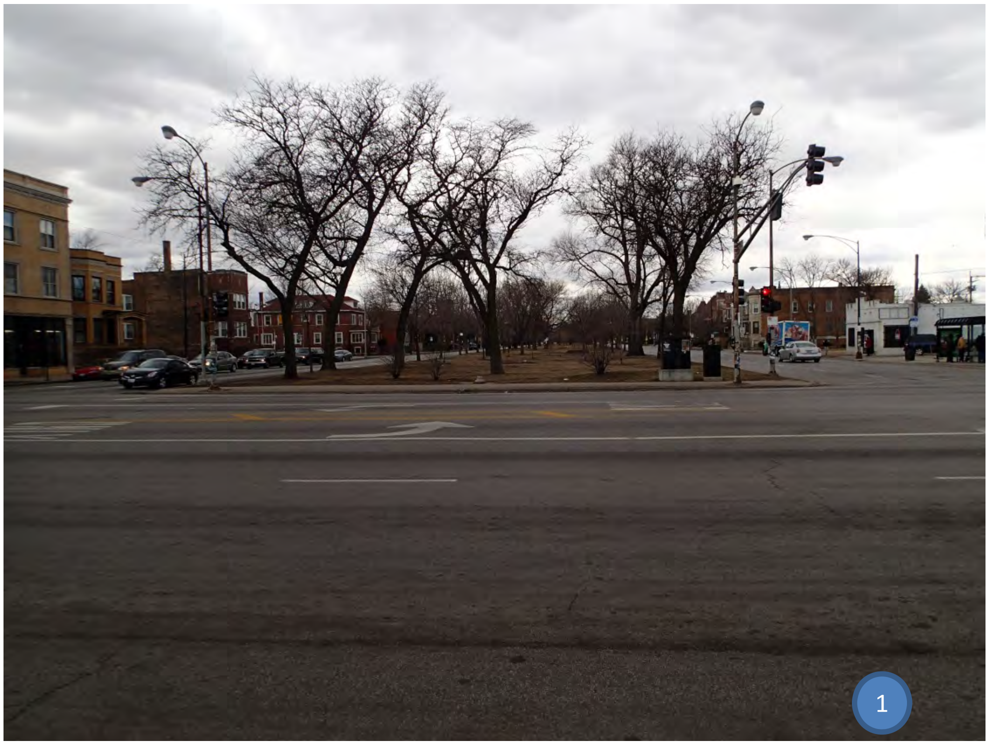
Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

Property	No Adverse Effect
1. Chicago Park Boulevard System	-All six possible Station locations**

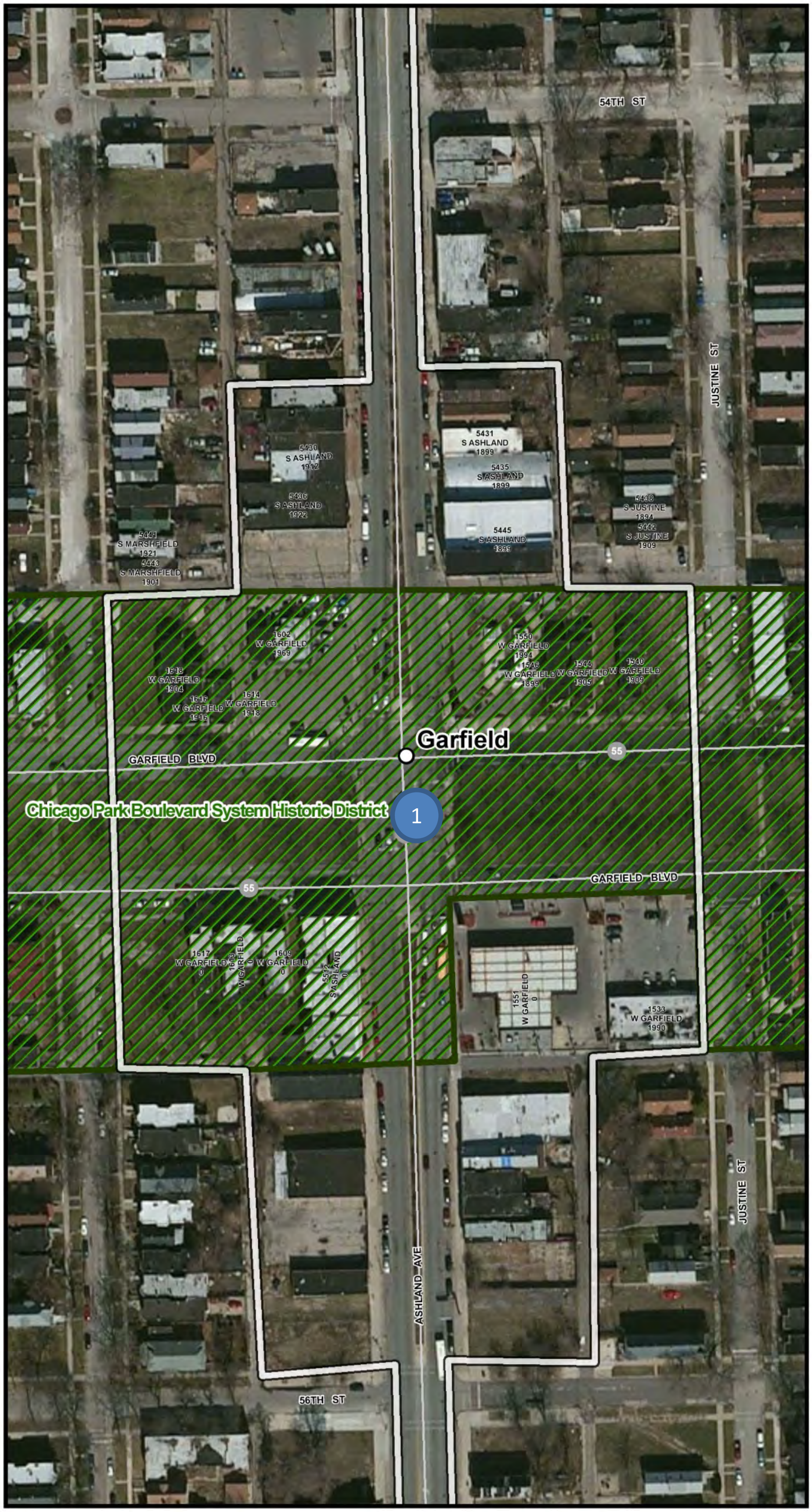
** Due to a design that fits the historic context and is of similar size and scale to existing shelters along the corridor

Photos:



West Garfield & South Ashland Ave

Station Area 26: Garfield Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 28: 63rd

The intersection is a typical urban environment full of activity and characterized by several early 20th century buildings as well as more modern mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

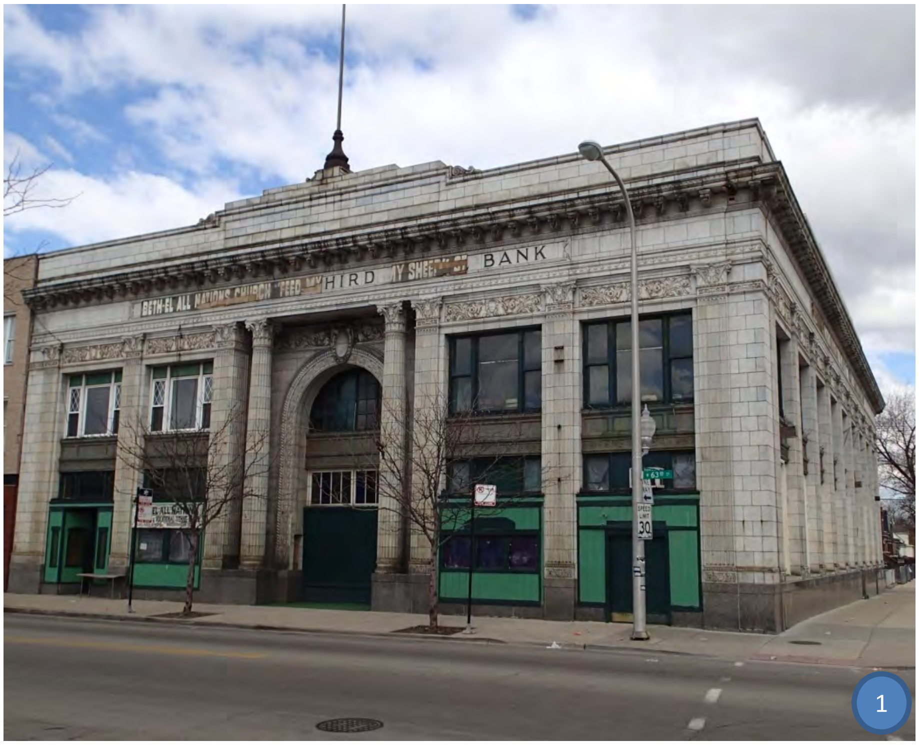
Property / Description	Date	CHRS	Landmark	NRHP
1. 1534 West 63rd Street: Classical Revival Commercial Building	1900s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

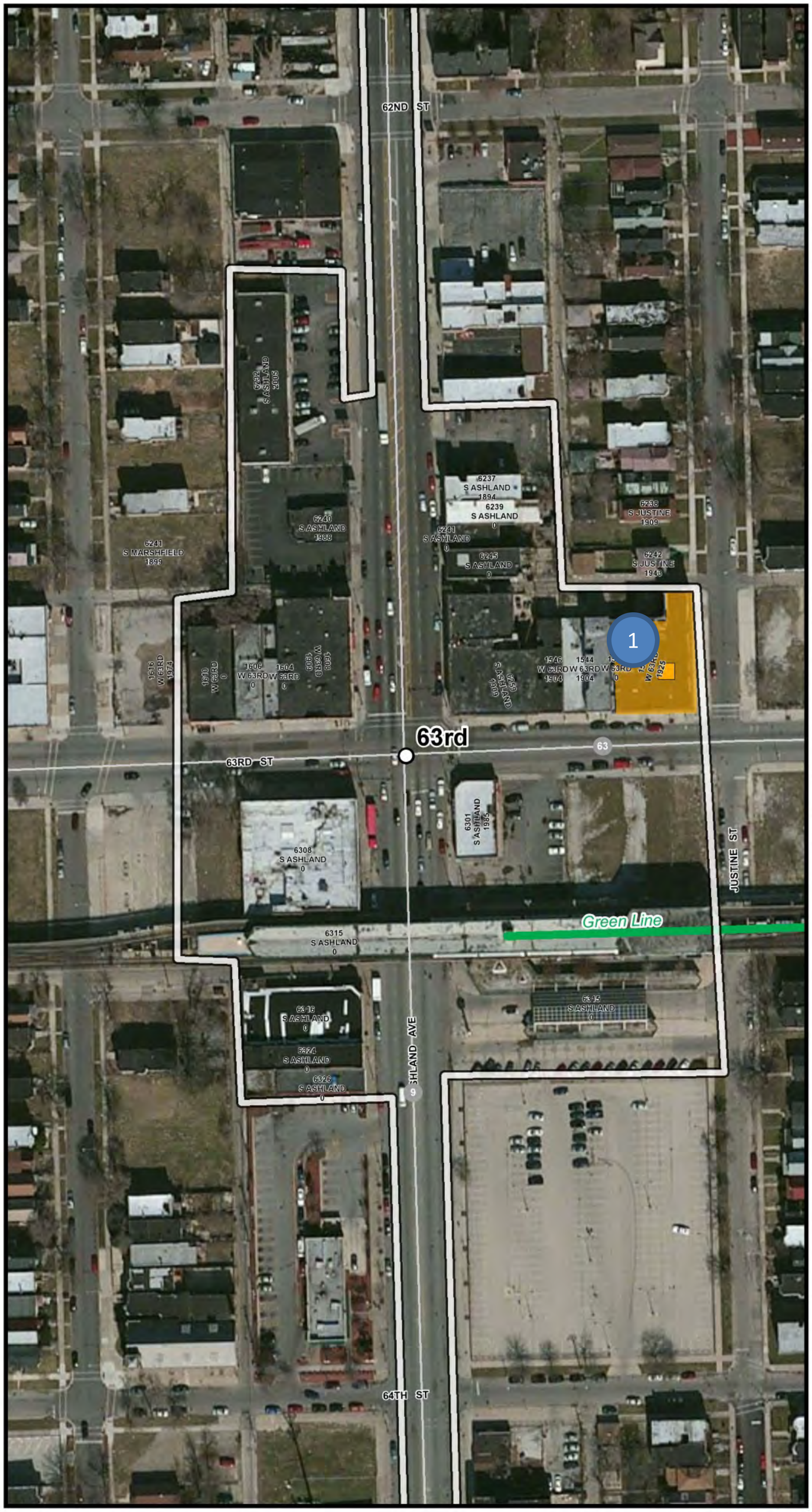
Property	No Adverse Effect
1. 1534 West 63rd Street	- Median Station north or south of 63rd St - SB Curbside Station north or south of 63rd St - NB Curbside Station north or south of 63rd St

Photos:



1534 West 63rd Street

Station Area 28: 63rd Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Station Area 31: 79th

The intersection is a typical urban environment full of activity and characterized by modern commercial buildings--a gas station and retail stores--as well as several older mixed-use buildings. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

Property / Description	Date	CHRS	Landmark	NRHP
1. 7922 South Ashland Avenue: Art Deco/ Moderne Mixed Use Bldg.	1931	No	No	Recommended Eligible
2. 7912 South Ashland Avenue: Art Deco/ Moderne Mixed Use Bldg.	1930s	No	No	Recommended Eligible
3. 7845 South Ashland Avenue: Classical Revival Mixed Use Building	1920s	Orange	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

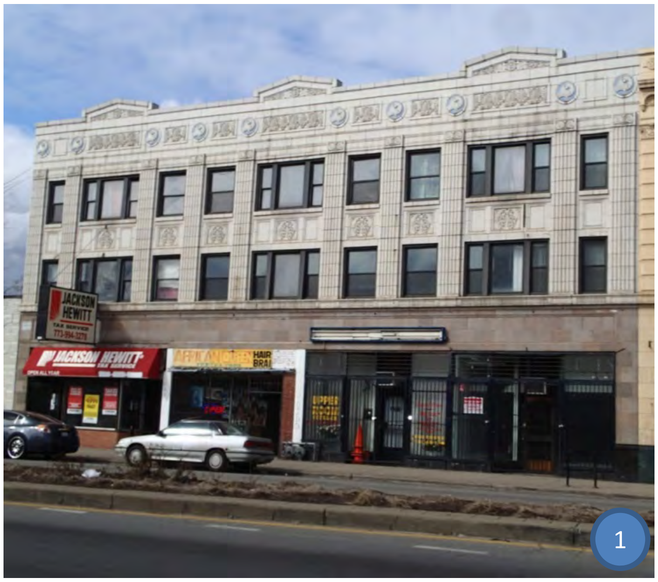
Property	No Adverse Effect
1. 7922 South Ashland Avenue	- Median Station north or south of 79th St - SB Curbside Station north or south of 79th St - NB Curbside Station north or south of 79th St
2. 7912 South Ashland Avenue	- Median Station north or south of 79th St - SB Curbside Station north of 79th St - NB Curbside Station north or south of 79th St - SB Curbside Station south of 79th St *
3. 7845 South Ashland Avenue	- Median Station north or south of 79th St - SB Curbside Station north or south of 79th St - NB Curbside Station south of 79th St - NB Curbside Station north of 79th St*
* Due to design of station being similar in size and scale to existing shelters along the corridor	

Photos:

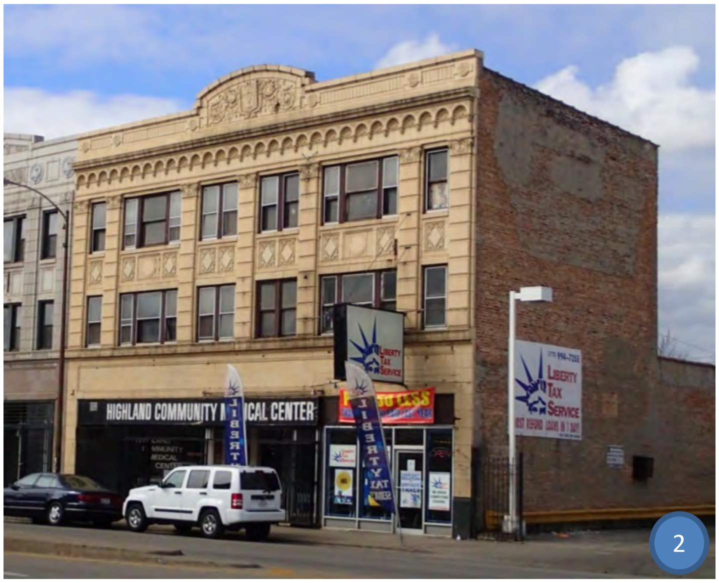
See Next Page

Station Area 31: 79th Cont'd

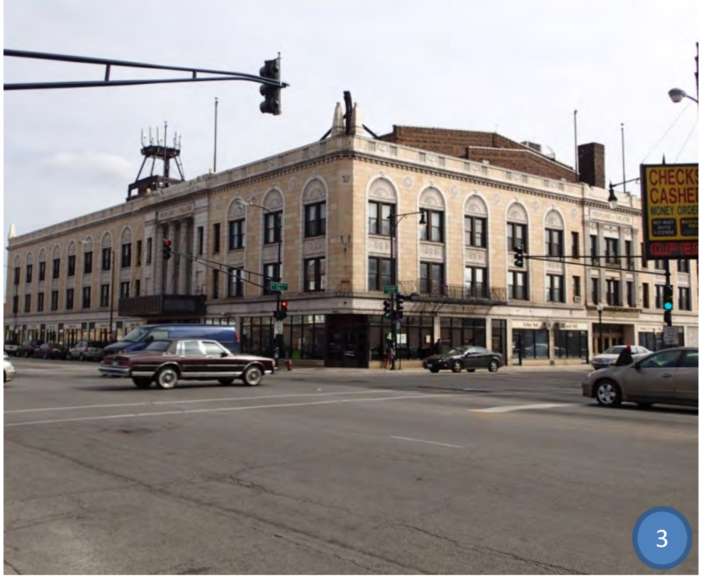
Photos:



7922 South Ashland Avenue

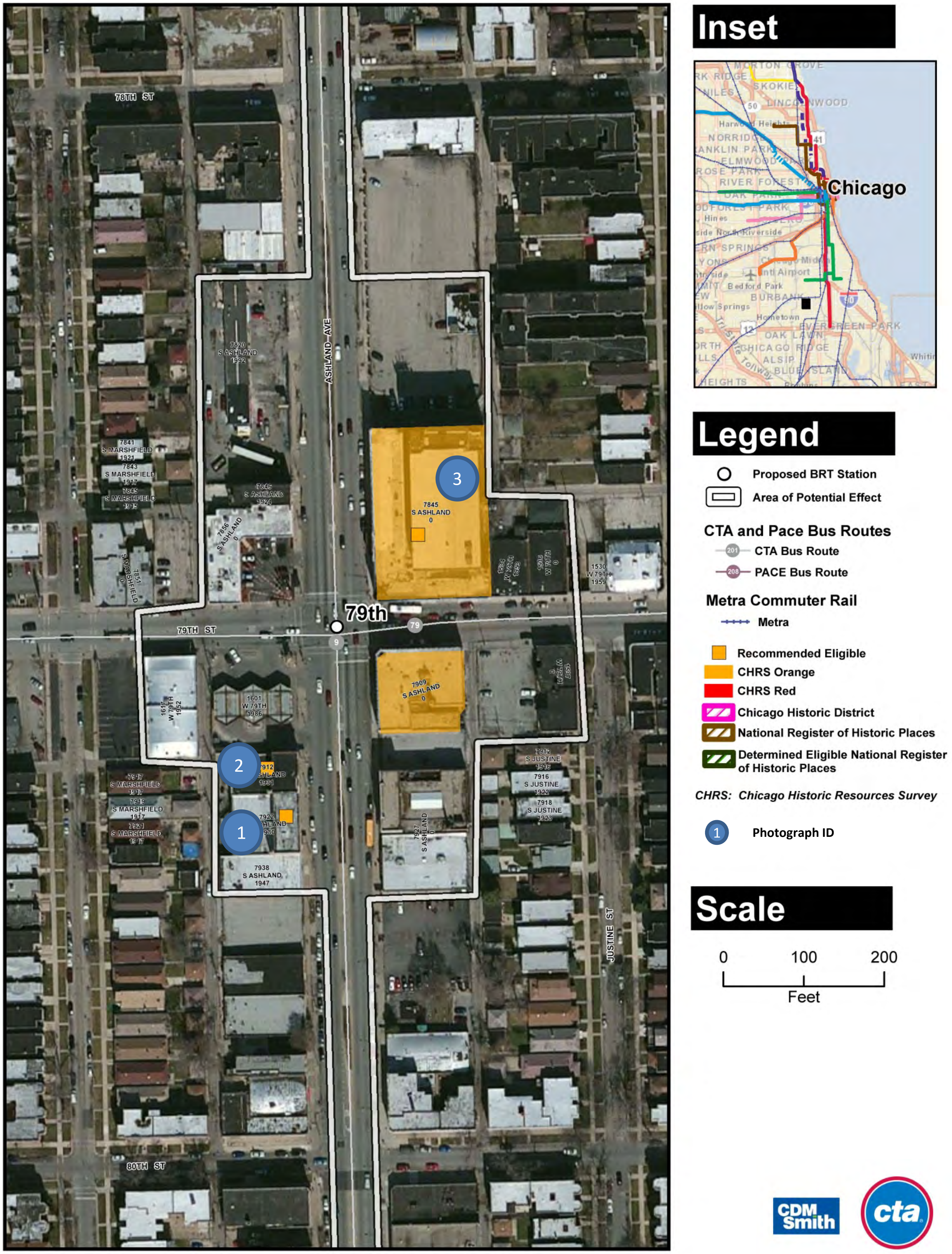


7912 South Ashland Avenue



7845 South Ashland Avenue

Station Area 31: 79th Cont’d



Station Area 35: 95th

The intersection is a typical urban environment full of activity and characterized by modern commercial buildings along its western side including a gas station and fast food restaurant as well as several older mixed-use buildings located on the eastern side of Ashland. The buildings appear to be in good to excellent condition. The following NRHP historic resources were identified within this station area:

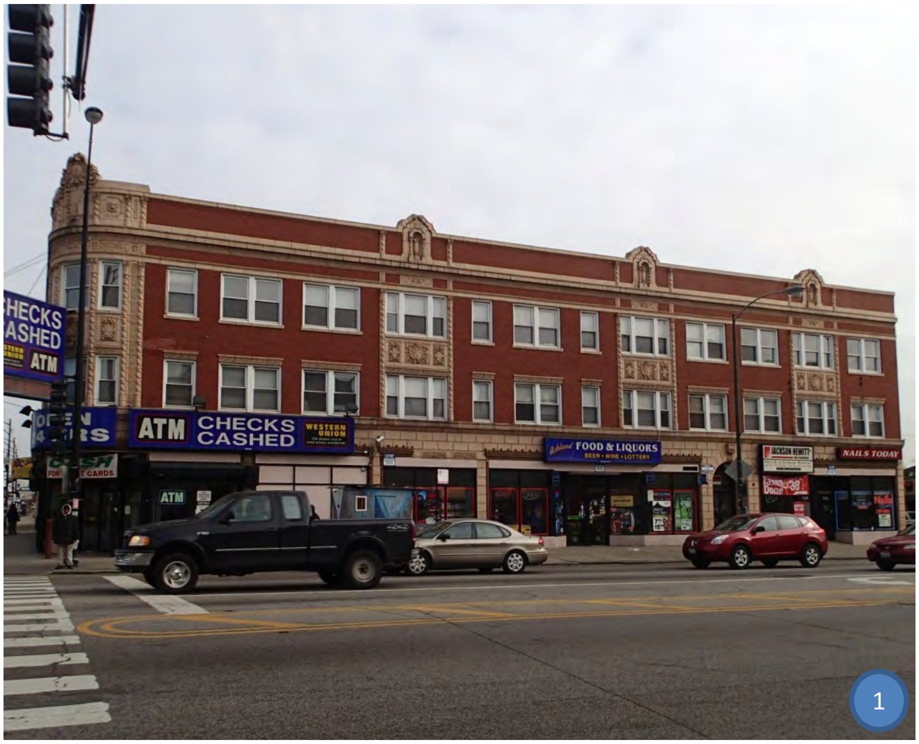
Property / Description	Date	CHRS	Landmark	NRHP
1. 9459 South Ashland Avenue: Classical Revival Mixed Use Building	1880s	No	No	Recommended Eligible

Effects Assessment:

For each recommended eligible and listed resource, the table below describes the 6 possible station configurations and whether or not they result in any adverse effects on nearby historic properties.

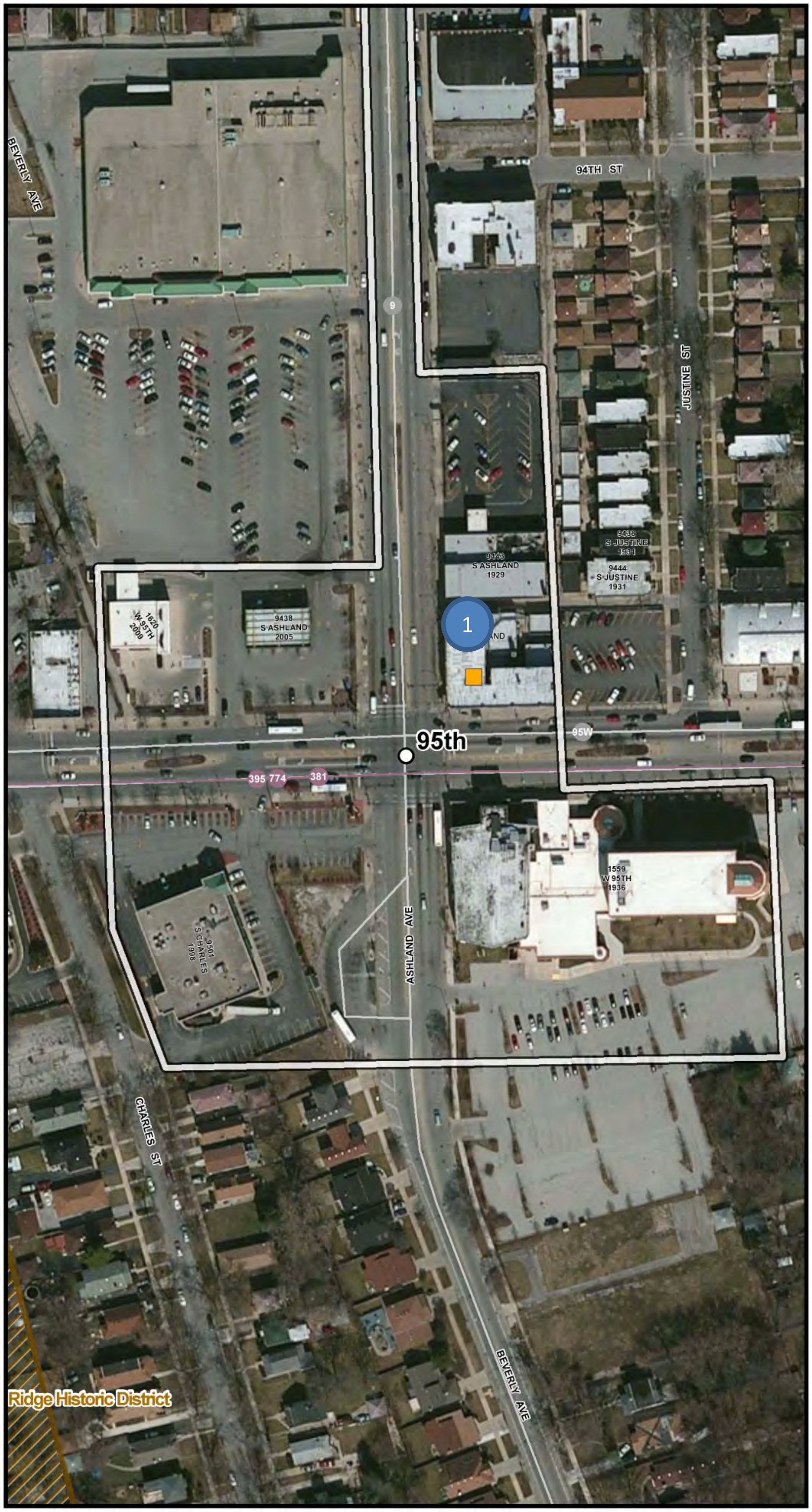
Property	No Adverse Effect
1. 9459 South Ashland Avenue	- Median Station north or south of 95th St - SB Curbside Station north or south of 95th St - NB Curbside Station south of 95th St - NB Curbside Station north of 95th St*
*** Due to design of station being similar in size and scale to existing shelters along the corridor**	

Photos:



9459 South Ashland Avenue

Station Area 35: 95th Cont'd



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Between Station Area: North Ashland Avenue

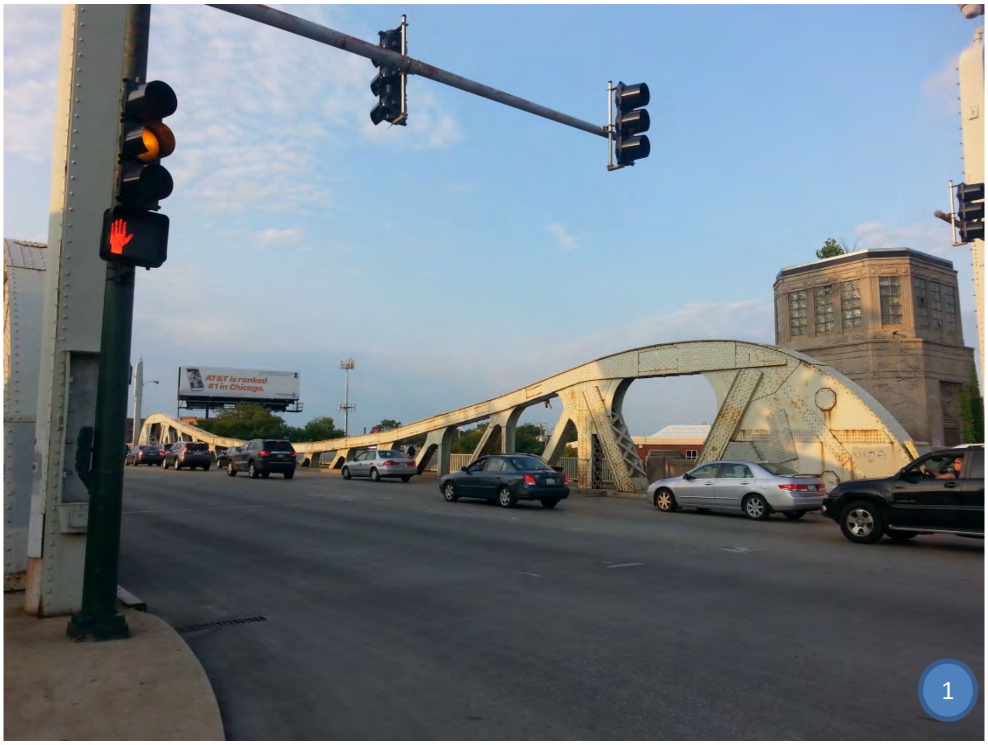
The location is a typical urban environment full of activity and characterized by modern commercial buildings as well as parking lots and industrial areas. The following NRHP historic resources were identified within this area:

Property / Description	Date	CHRS	Landmark	NRHP
1. North Ashland Avenue Bridge: Art Deco	1936	No	No	Recommended Eligible

Effects Assessment:

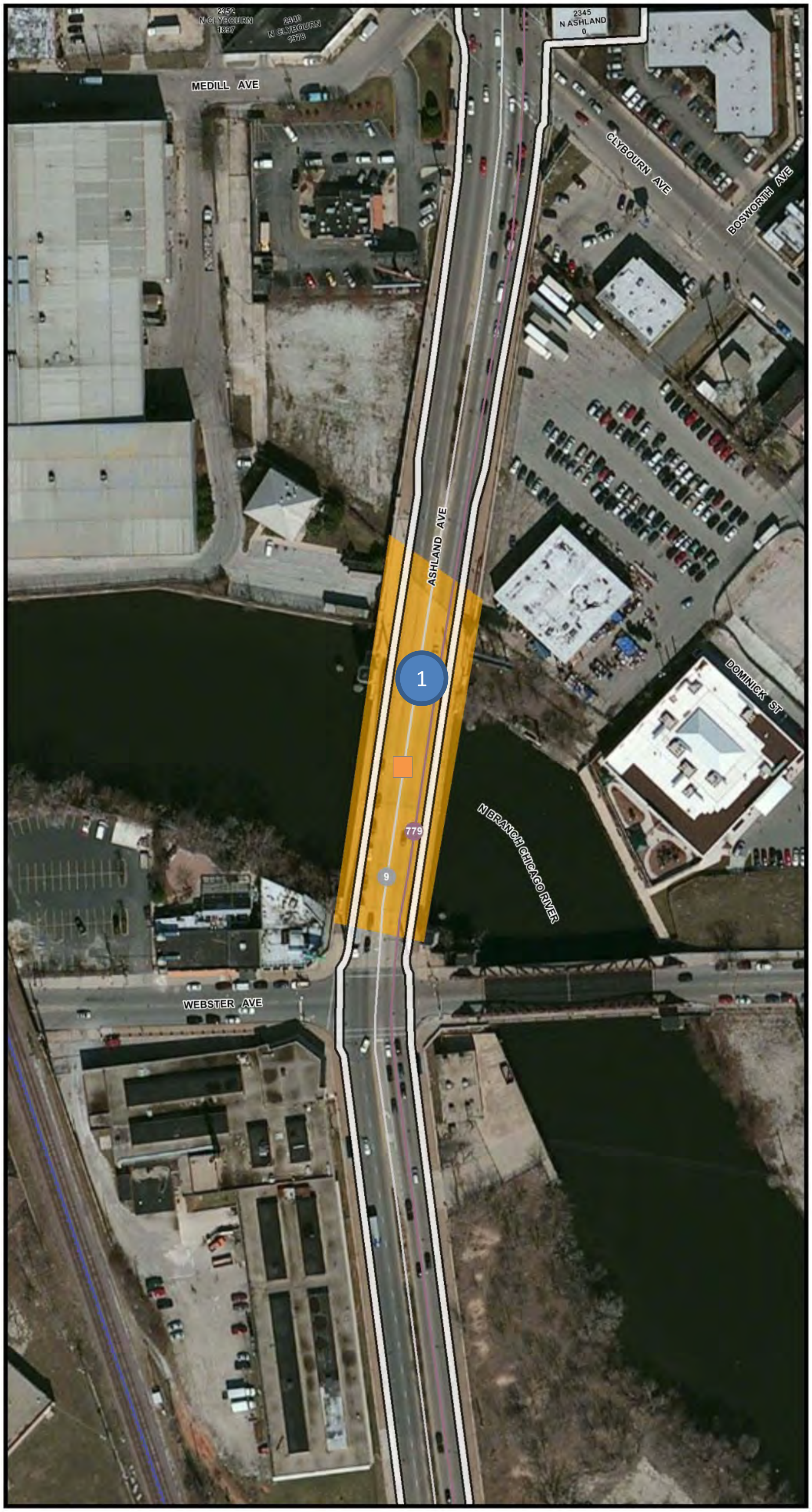
For each recommended eligible and listed resource; potential effects were examined to see if they would occur based on the proposed project . As no station is proposed in this location and project activities would be limited to the milling of pavement, re-paving, re-striping, median improvements, and spot landscaping improvements, there would ne no adverse effect on this resource.

Photos:



North Ashland Avenue Bridge

Between Station Area: North Ashland Avenue



Inset

Legend

○ Proposed BRT Station

▭ Area of Potential Effect

CTA and Pace Bus Routes

201 CTA Bus Route

208 PACE Bus Route

Metra Commuter Rail

Metra

🟧 Recommended Eligible

🟧 CHRS Orange

🟥 CHRS Red

▨ Chicago Historic District

▨ National Register of Historic Places

▨ Determined Eligible National Register of Historic Places

CHRS: Chicago Historic Resources Survey

① Photograph ID

Scale

0 100 200

Feet

Appendix F-2: CMAP Air Quality Coordination

Chicago Metropolitan
Agency for Planning

233 South Wacker Drive
Suite 800
Chicago, Illinois 60606

312 454 0400
www.cmap.illinois.gov

Tier II Consultation Meeting

Minutes - June 20, 2013

Participants:

Reggie Arkell	FTA – via phone
Patricia Berry	CMAP
Bill Brown	NIRPC – via phone
Brian Carlson	IDOT – via phone
Bruce Carmitchel	IDOT – Office of Planning & Programming
Michael Connelly	CTA
Kama Dobbs	CMAP
John Donovan	FHWA
Jim Earl	INDOT – via phone
Jesse Elam	CMAP
Doug Ferguson	CMAP
Matt Fuller	FHWA – via phone
Larry Heil	FHWA IN Division – via phone
Mike Hine	FHWA – via phone
Michael Leslie	USEPA – via phone
Jane Lin	UIC
Alice Lovegrove	Parsons Brinckerhoff
Kathy Luther	NIRPC – via phone
Anthony Maietta	USEPA
Kirsten Mawhinney	Chicago Transit Partners
Joyce Newland	FHWA IN Division – via phone
Holly Ostdick	CMAP
Ross Patronsky	CMAP
Jim Pinkerton	INDOT LaPorte District – via phone
Mark Pitstick	RTA
Mike Rogers	IEPA
Jason Salley	IDOT – via phone
Steve Schilke	IDOT – via phone
Chris Schmidt	IDOT
Ron Shimizu	Parsons Brinkerhoff
Kermit Wies	CMAP
Walt Zyznieuski	IDOT – via phone

1.0 Call to Order and Introductions

The meeting was called to order at 10:30 a.m. All participants introduced themselves.

2.0 Agenda Changes and Announcements

Mr. Pitstick announced that RTA is currently updating their Regional Transit Strategic Plan and distributed summary information and a request for input. Ms. Berry requested to move agenda item 9.0 above item 8.0.

3.0 Approval of Minutes – February 14, 2013

On a motion by Mr. Rogers, seconded by Mr. Pitstick, the minutes of February 14, 2013 were approved as presented.

4.0 Standard Conformity Language

Ms. Berry reported that staff posted minor changes to the standard conformity language on the CMAP website to clarify that conformity determinations are made on the Plan and the TIP.

5.0 $PM_{2.5}$ Redesignation Request

Mr. Leslie reported that approval of the state's $PM_{2.5}$ redesignation request is expected within the next few weeks and that new budgets posted on the USEPA adequacy website would also be finalized in the next 4-6 weeks. Mr. Patronsky asked if the budgets should be used for the next CMAP conformity analysis to be completed in August. Mr. Leslie confirmed that they should.

6.0 MAP-21 CMAQ Requirements for $PM_{2.5}$ Obligations

Ms. Berry reported that MAP-21 requires that 25% of annual CMAQ obligations be for projects that reduce $PM_{2.5.}$ Mr. Donovan stated that federal guidance on the requirement is not yet available, but that a broad interpretation of qualifying project types is likely. Mr. Leslie and Mr. Patronsky added that most CMAQ project categories clearly qualify, but those that are targeting mode shift from single occupant vehicles, such as bicycle/pedestrian and commuter parking projects offer only a small particulate reduction and are not in the spirit of the requirement.

7.0 Project Information

7.1 I-55 from Lorenzo Rd to IL 129 (TIP ID 12-07-0020)

Ms. Berry reported that TIP ID 12-07-0020 is an IDOT project on I-55 from Lorenzo Rd to IL 129. The project currently includes a proposed auxiliary lane between IL 129 and Lorenzo which is essentially an extension of the parallel entrance and exit terminals. The interchange project will be reevaluated as part of the Illiana Tier II study efforts. Given the relationship between this project and the Illiana, CMAP, with IDOT's concurrence, has converted the project to "Unconstrained" and moved post- phase 1 engineering phases out of the TIP. As consideration of the Illiana approaches, the project description and work types may be further updated. Mr.

Carlson asked if a request for a plan amendment would then be required to convert the project to constrained. Ms. Berry responded that if a final determination is made that the I-55, Lorenzo to IL 129 project is part of the Illiana design, it is anticipated that the Department will include it in the Illiana submittal for the CMAP networks for the plan amendment.

7.2 I-290 Multimodal Corridor

Ms. Berry reported that a notice was posted in the Federal Register that the study limits on this project have been extended east from Cicero to Racine.

8.0 Hot Spot Analysis

8.1 Illiana Expressway

Ms. Lovegrove presented an overview of the proposed approach to the hot spot analysis of the Illiana Expressway. The team concurred with the approach with ongoing consultation as appropriate, and confirmed that re-entrained road dust does not need to be considered, that a link height of zero (ground level) is appropriate, and that detailed analysis at the US 45 to I-57, IL 1 to US 41 and I-55 to IL 53 locations is appropriate.

8.2 I-90 Managed Lanes (I-90 From I-190 to Harlem Ave)

IDOT confirmed that they received data they requested to help determine whether a hot spot analysis will be required for this project.

8.3 Ashland Avenue Bus Rapid Transit (16-13-0005)

Mr. Patronsky reported that CTA had provided a project overview and details of changes to the number and hours of vehicles in service, number of stops and the location, number of vehicles and length of time of vehicle layovers. The team concurred that, based on the information provide, the project is not a project of air quality concern and a hot spot analysis is not required.

8.4 Tracking Projects of Air Quality Concern

Ms. Berry reported that staff developed a draft table for tracking projects of air quality concern (PAQC) and action the team has taken on those projects and requested feedback. The team agreed that a table would be useful and that projects should be tracked at least until they are complete. IDOT and FHWA were asked to provide staff with any other projects that should be documented in the table.

9.0 Transportation Conformity Particulate Matter Hot-Spot Air Quality Project

Dr. Lin reported that a draft final report has been submitted to the Illinois Center for Transportation and provided an overview of the findings. Mr. Rogers noted that one of the goals of the project was to develop thresholds for determining when projects should undergo hot spot analysis, however as Dr. Lin reported, the case study results were too varied to do so. Mr. Rogers stated that in the absence of threshold recommendations from modeling, the region should set criteria that are locally appropriate. Ms. Leslie stated that it is appropriate to continue to work through the consultation team for the identification of projects of air quality concern.

10.0 Major Capital Project Updates

Ms. Berry reminded the team that a brief update on the status of Major Capital Projects is available on the Transportation Committee minutes web page.

11.0 Other Business

Mr. Maietta asked if there would be any value in broader (USEPA Region 5 area) discussions about hot spot thresholds. The team agreed that it would and noted that AMPO and other professional organization have air quality groups and committees that could be resources. Dr. Lin added that next year's TRB meeting will include a session on case studies from around the nation.

12.0 Public Comment

None.

13.0 Next Meeting

The next meeting is on call.

14.0 Adjournment

The meeting adjourned at 12:10 p.m.

Tier II Consultation Team Members:

	CMAP		FHWA		FTA		IDOT
	IEPA		RTA		USEPA		

Appendix F-3: Agency Meetings Supporting Material

Ashland BRT

November 13, 2012 Agency Coordination Meeting	
Gabe Klein	CDOT
Scott Kubly	CDOT
John Yonan	Cook County Department of Transportation and Highways
Jennifer Killen	Cook County Department of Transportation and Highways
Bob Ginsburg	Cook County Department of Transportation and Highways
John Fortmann	IDOT
Rebekah Scheinfeld	CTA
Joe Iacobucci	CTA
Mike Connelly	CTA
Kevin O'Malley	CTA

March 5, 2013 Agency Coordination Meeting	
Luann Hamilton	CDOT
John Fortmann	IDOT
Rebekah Scheinfeld	CTA
Joe Iacobucci	CTA

May 23, 2013 Agency Coordination Meeting	
Luann Hamilton	CDOT
Jennifer Killen	Cook County Department of Transportation and Highways
Bob Ginsburg	Cook County Department of Transportation and Highways
John Fortmann	IDOT
Pete Harmet	IDOT
Rebekah Scheinfeld	CTA
Joe Iacobucci	CTA
Mike Connelly	CTA
Kevin O'Malley	CTA

July 25, 2013 Agency Coordination Meeting	
Jason Salley	IDOT
Danny Drew	IDOT
Steve Travia	IDOT
Pete Harmet	IDOT
Chris Ziemann	CDOT/CTA
Luann Hamilton	CDOT
Keith Privett	CDOT
Maria Choca Urban	Cook County Department of Transportation and Highways
John Yonan	Cook County Department of Transportation and Highways
Bob Ginsburg	Cook County Department of Transportation and Highways
Joe Iacobucci	CTA
Steve Goodreau	CDM Smith
Jenifer Palmer	CDM Smith
Greg Saur	CDM Smith

August 14, 2013 Agency Coordination Meeting	
John Baczek	IDOT/PROG
Rick Wojcik	IDOT/PROG
Fawad Aqueel	IDOT/PROG
Scott Stitt	IDOT/BDE
Michael Hine	FHWA
Dennis Bachman	FHWA
Jason Salley	IDOT/PROG
Katie Kukielka	IDOT/AECOM
Steve Ott	PB
David McGibbon	PB
Matt Fuller	FHWA
Michelle Allen	FHWA
Walt Zyznieuski	IDOT/BDE
Melissa McGhee	PB
Rock Powell	PB
Chris Byars	FHWA
Robin Helmerichs	FHWA
Paul Schneider	IDOT/PMC
Chuck Stenzel	TranSystems
Grace Dysico	TranSystems
Matt Smith	TranSystems
Sam Mead	IDOT/PROG
Dusanka Kangrga	IDOT/PROG
Kimberly Murphy	IDOT/PROG
Vanessa Ruiz	IDOT/PROG
Jim Prola	IDOT/AECOM
Marie Glynn	IDOT/CH2M HILL
Catherine Kibble	IDOT/DESIGN
Scott Czaplicki	IDOT/PROG
Mike Folkening	Civiltech
Joe Emry	Civiltech
Bob Andres	Civiltech
Aren Kriks	IDOT/PROG
Ojas Patel	IDOT/PROG
Serin Keller	IDOT/DESIGN
Joe Saccomanno	IDOT/DESIGN
Don Wittmer	HNTB
Derek Johnson	HNTB
Mark Peterson	IDOT/PMC
Marty Morse	IDOT/PROG
Cary Lewis	IDOT/PROG
Jack Melhuish	HRG
Sean Ladien	HRG
Terry Walloch	IDOT/PROG
Griselda Monsivais	IDOT/PROG
Tom Gallenbach	IDOT/TRAFFIC
Pedro Hurtado	CTA
Kevin Campbell	CTA/CTP

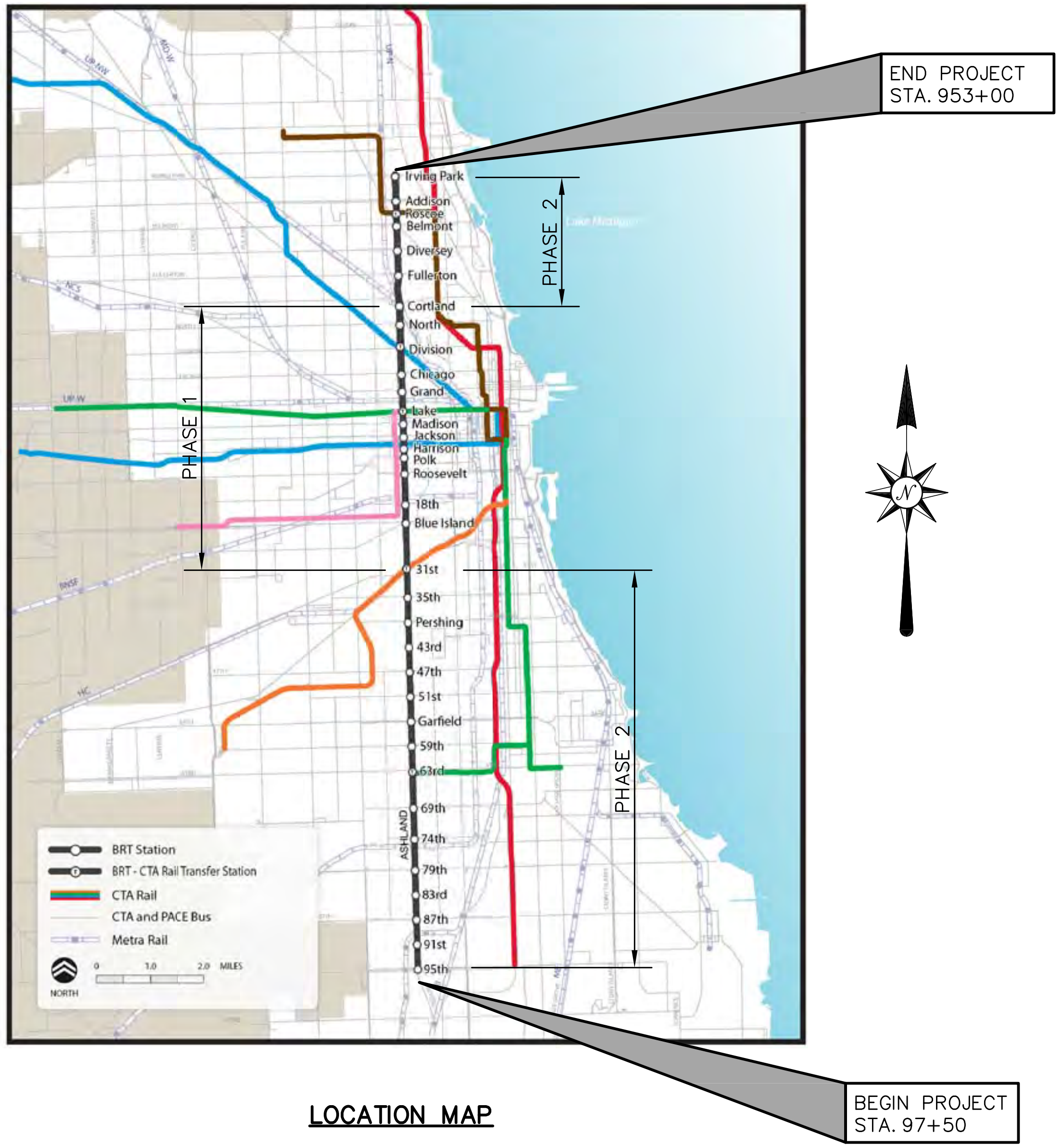
August 14, 2013 Agency Coordination Meeting, Cont’d.	
Bob Thomas	PB
Joseph Iacobucci	CTA
Stephen Goodreau	CDM Smith

APPENDIX G
Conceptual Engineering Plans

CHICAGO TRANSIT AUTHORITY

ASHLAND AVE. BUS RAPID TRANSIT PROJECT

CITY OF CHICAGO
COOK COUNTY, ILLINOIS



LOCATION MAP

INDEX OF SHEETS

TITLE SHEET.. 1
TYPICAL SECTIONS................................... 2–3
PLAN.. 4–44
STATION LAYOUT..................................... 45

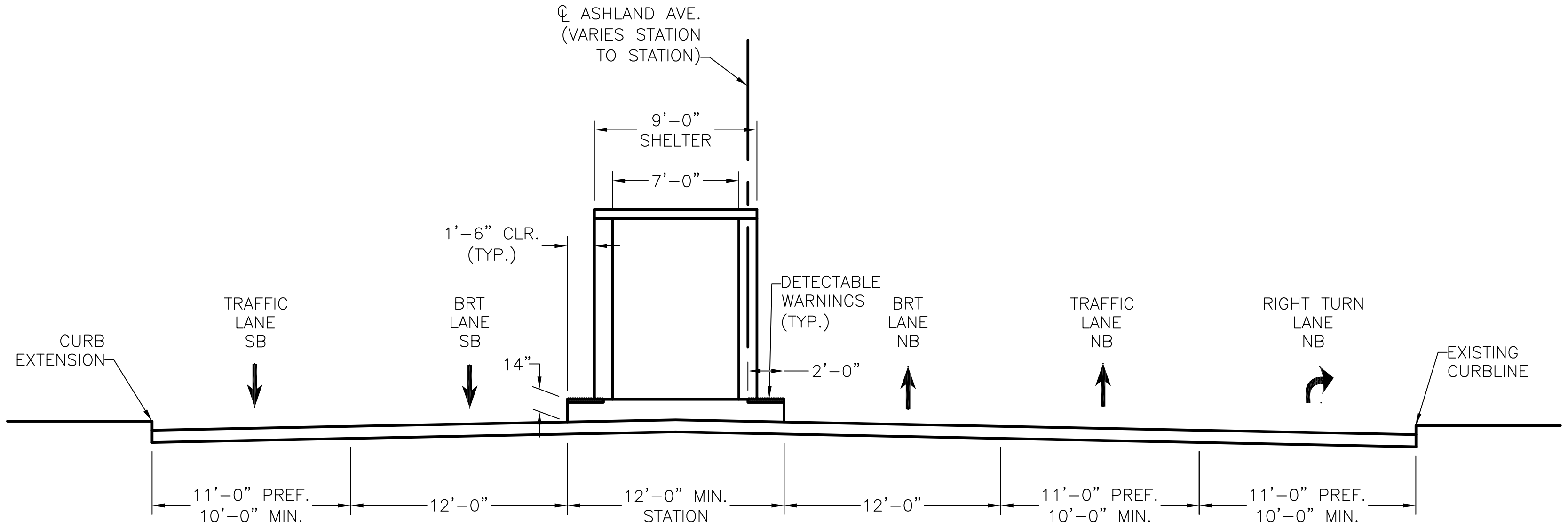
The following provides conceptual plans for the Ashland Avenue BRT Project. These plans are subject to further refinement in final design, the next phase of project development, based on additional traffic and engineering analysis and in coordination with supplemental agency and public outreach efforts.

CONCEPT ENGINEERING PLANS

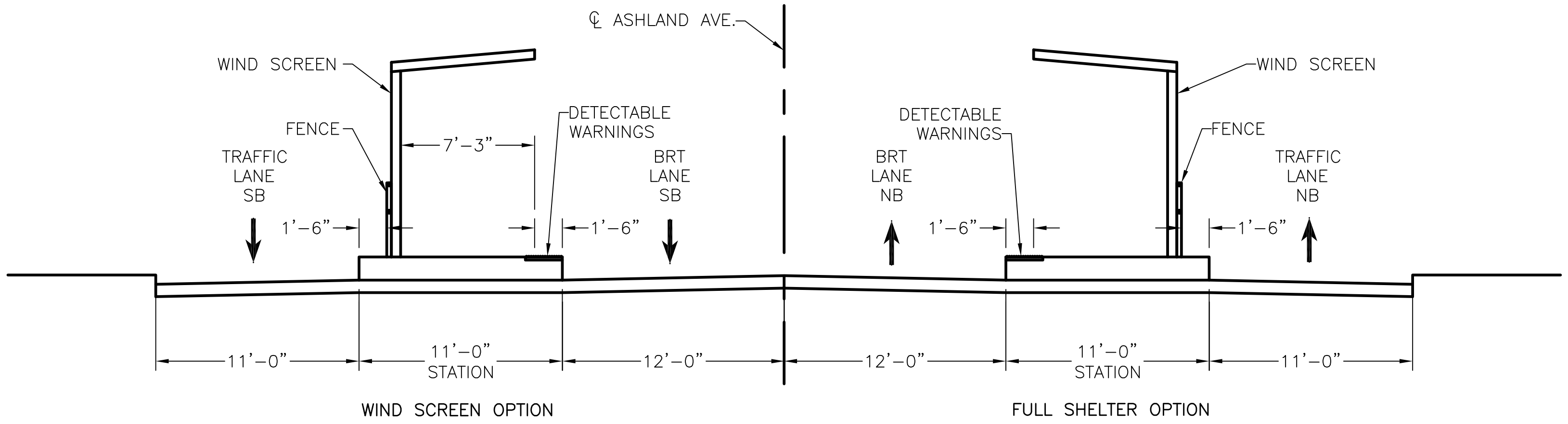
SEPTEMBER 2013

PLAN PREPARED BY:

CDM Smith
125 SOUTH WACKER DR.
SUITE 600
CHICAGO, IL 60606



CENTER STATION
SOUTH SIDE OF INTERSECTION
NORTH SIDE OPPOSITE



TWIN CENTER STATIONS
CORTLAND

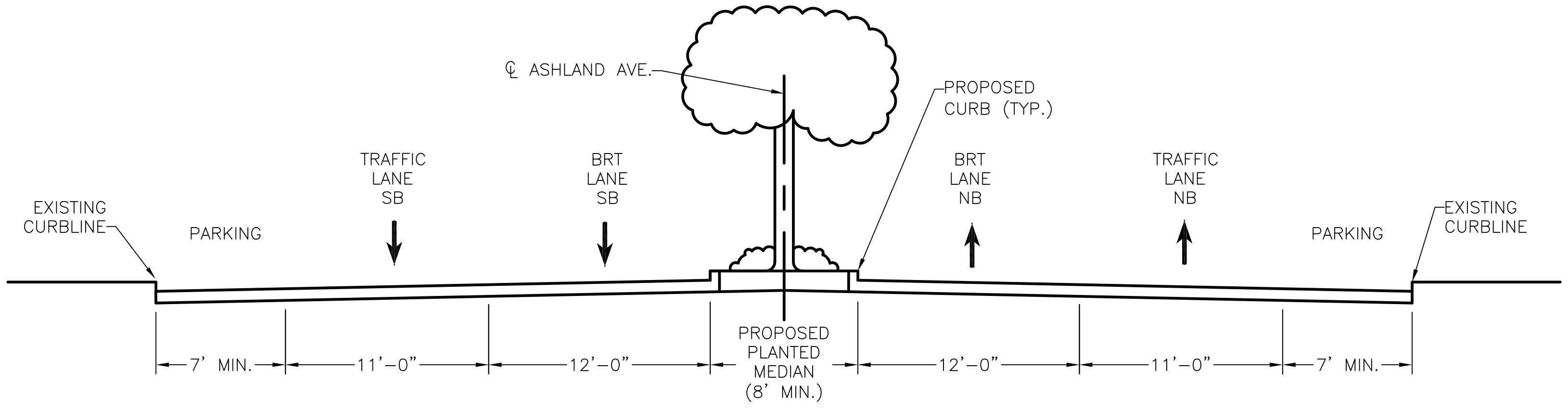
0 5 10
HORIZONTAL SCALE
IN FEET

CALCULATED
SMS

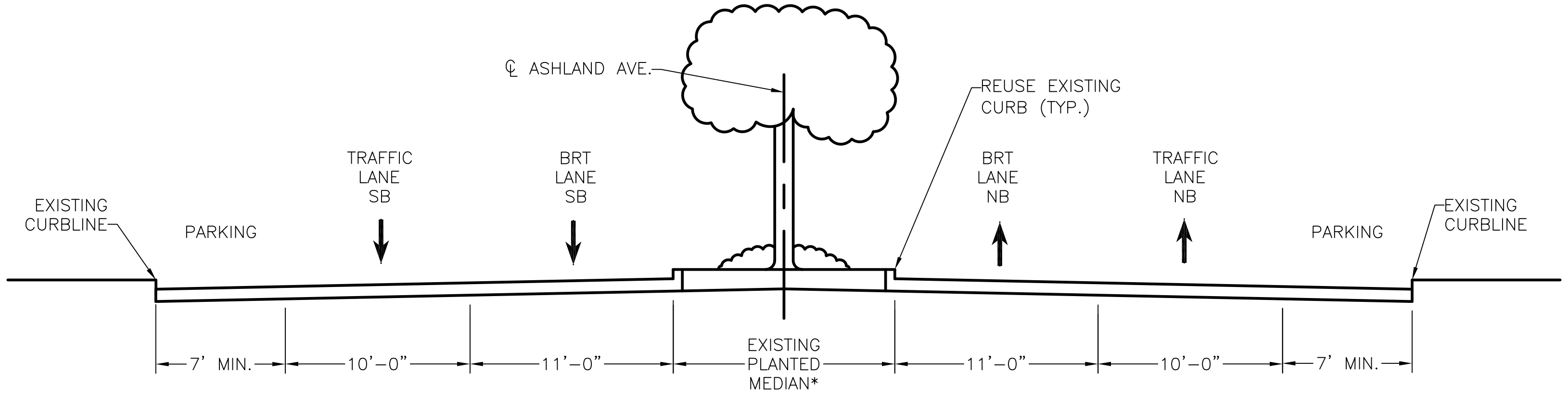
CHECKED
SDG

**PROTOTYPICAL
STATION SECTIONS**

ASHLAND AVE. BRT

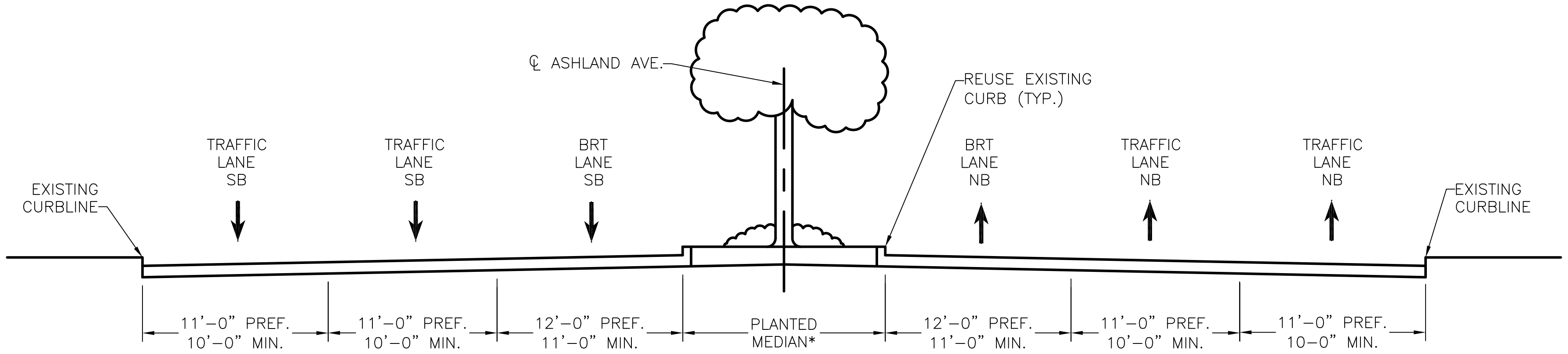


PROPOSED PLANTED MEDIAN



EXISTING PLANTED MEDIAN

*PLANTED MEDIAN WIDTH VARIES 12'-15'
EXISTING PLANTED MEDIAN REUSED
AND LENGTHS EXTENDED.



6-LANE SECTION
W. ROOSEVELT RD. TO W. WASHINGTON BLVD.

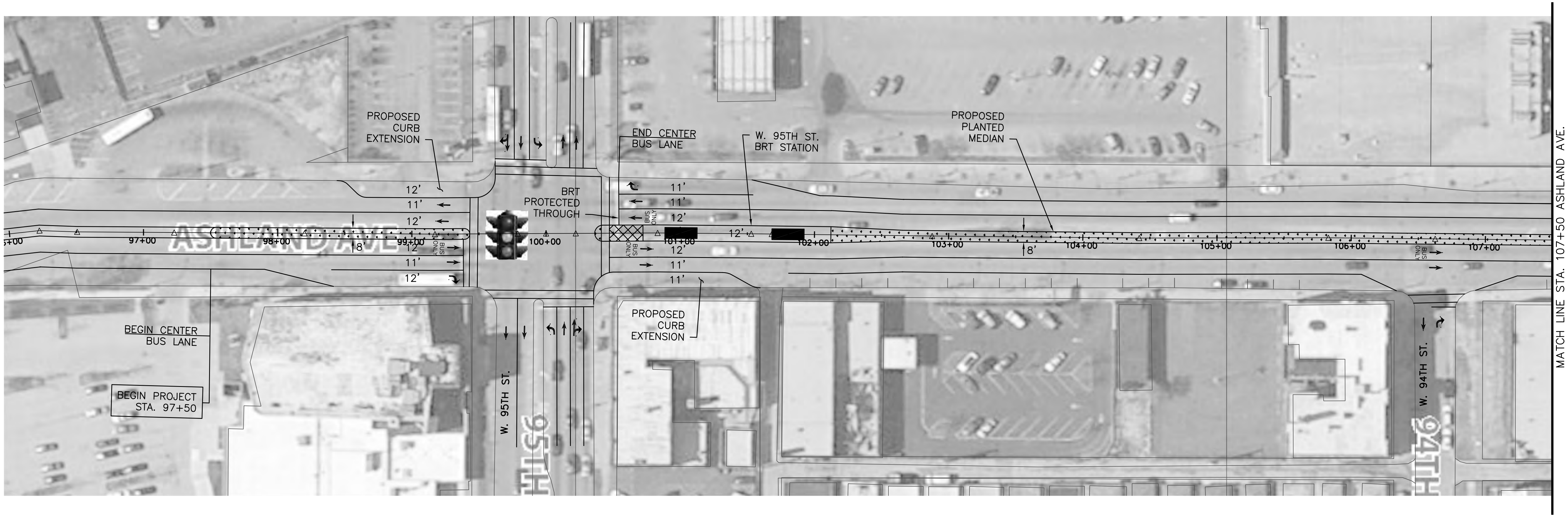
*PLANTED MEDIAN WIDTH VARIES 12'-15'
EXISTING PLANTED MEDIAN REUSED
AND LENGTHS EXTENDED.

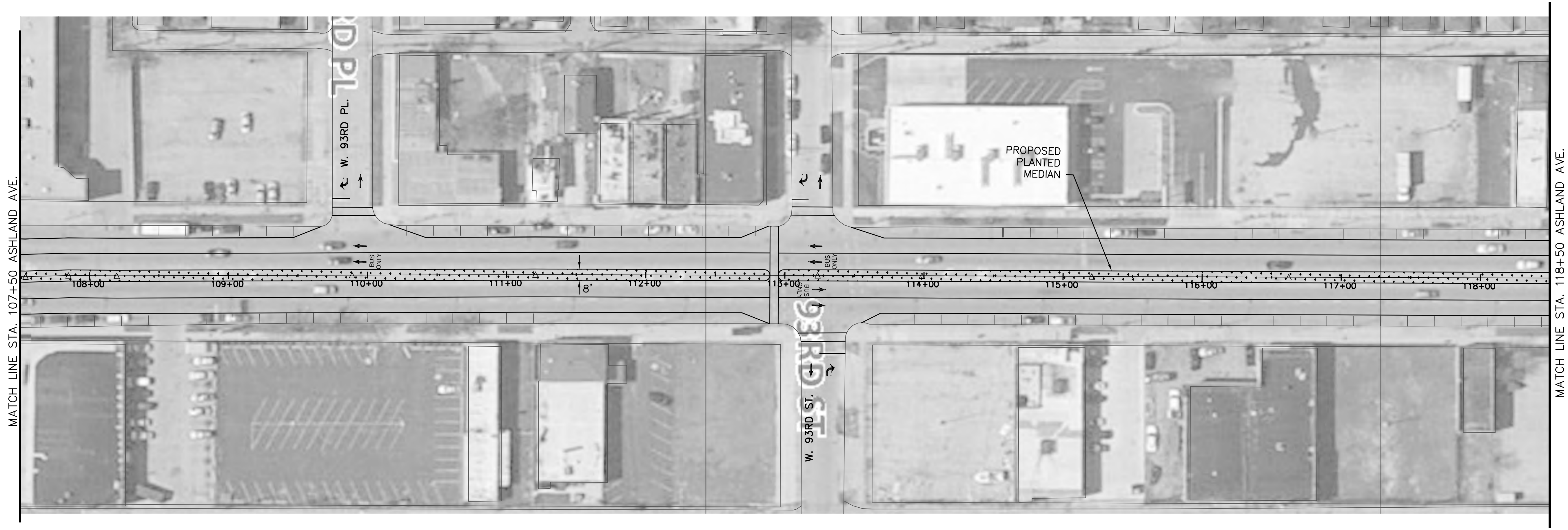
0 5 10
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PROTOTYPICAL MEDIAN SECTIONS

ASHLAND AVE. BRT



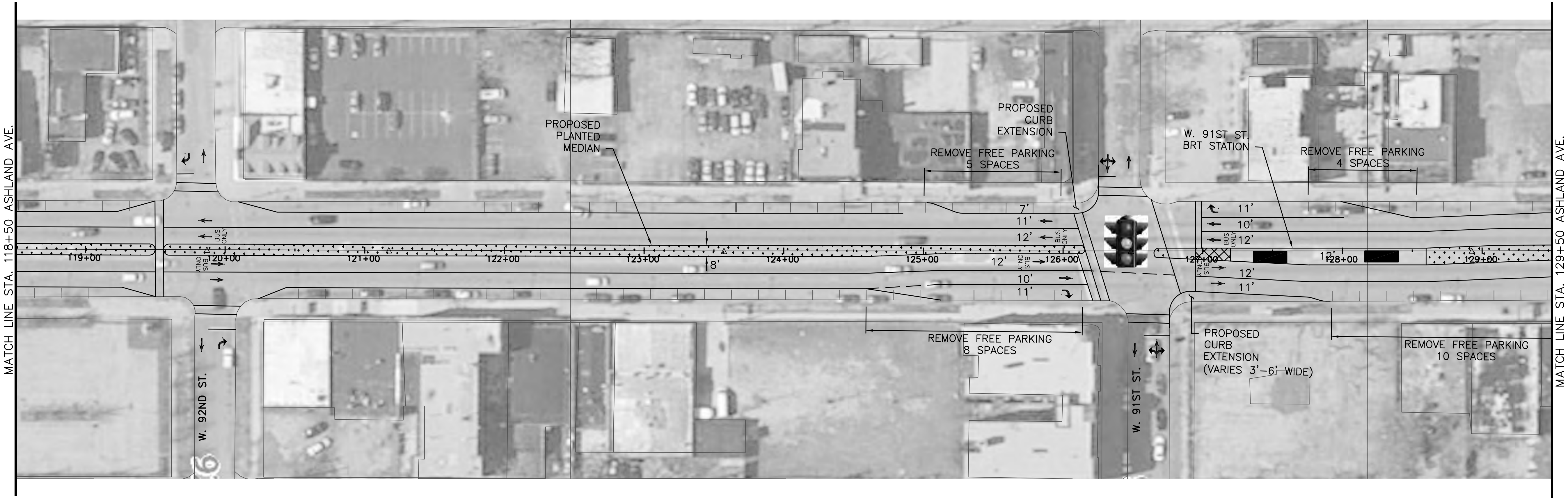


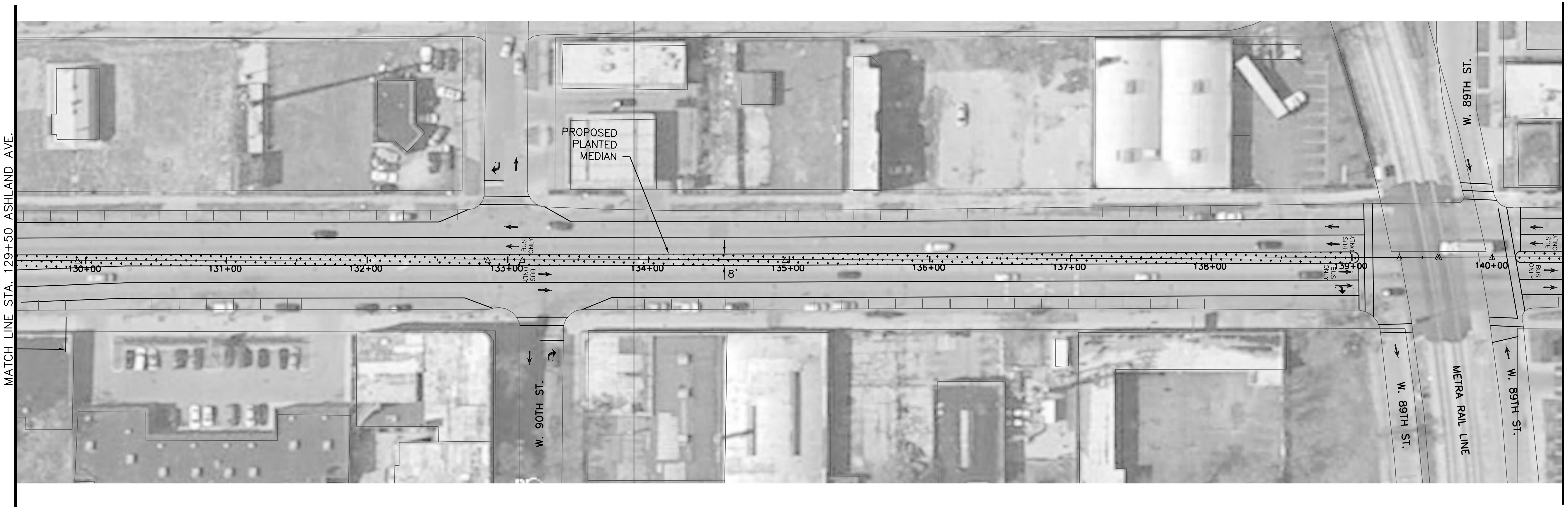
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED	CHECKED
SMS	SDG

PLAN – ASHLAND AVENUE
BEGIN TO STA. 118+50

ASHLAND AVE. BRT


MATCH LINE STA. 118+50 ASHLAND AVE.
PROPOSED PLANTED MEDIAN
PROPOSED CURB EXTENSION
REMOVE FREE PARKING 5 SPACES
W. 91ST ST. BRT STATION
REMOVE FREE PARKING 4 SPACES
MATCH LINE STA. 129+50 ASHLAND AVE.
7'
11'
12'
12'
10'
11'
11'
10'
12'
12'
11'
8'
BUS ONLY
119+00
120+00
121+00
122+00
123+00
124+00
125+00
126+00
127+00
128+00
129+00
W. 92ND ST.
REMOVE FREE PARKING 8 SPACES
W. 91ST ST.
PROPOSED CURB EXTENSION (VARIES 3'-6' WIDE)
REMOVE FREE PARKING 10 SPACES



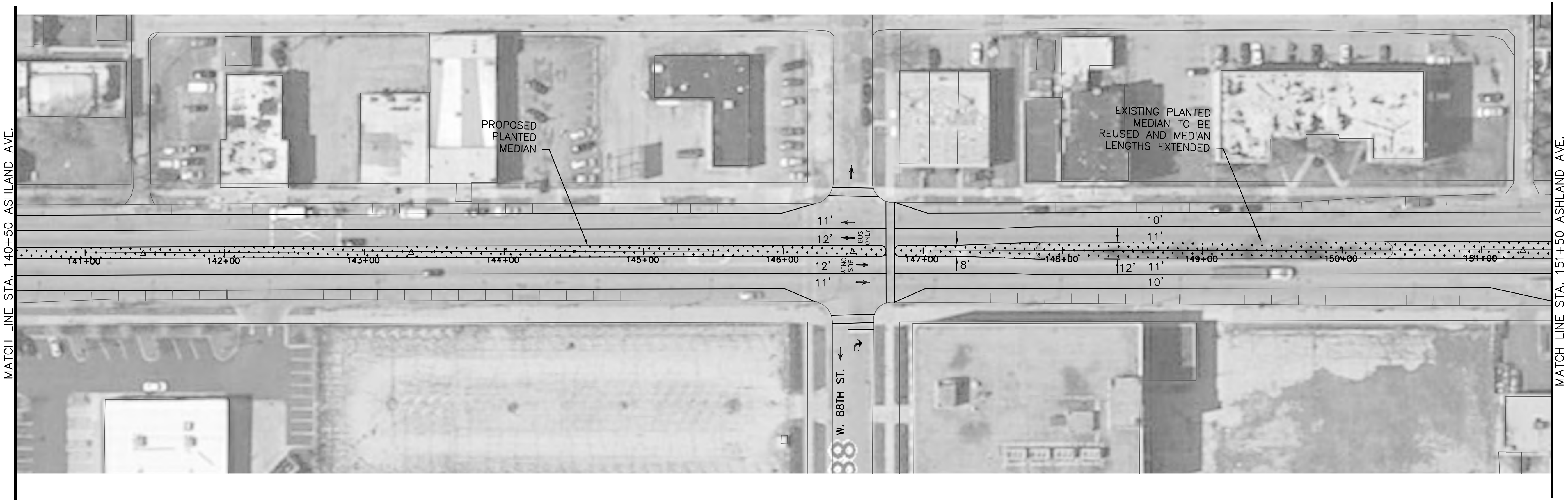
0 40 80
HORIZONTAL SCALE IN FEET

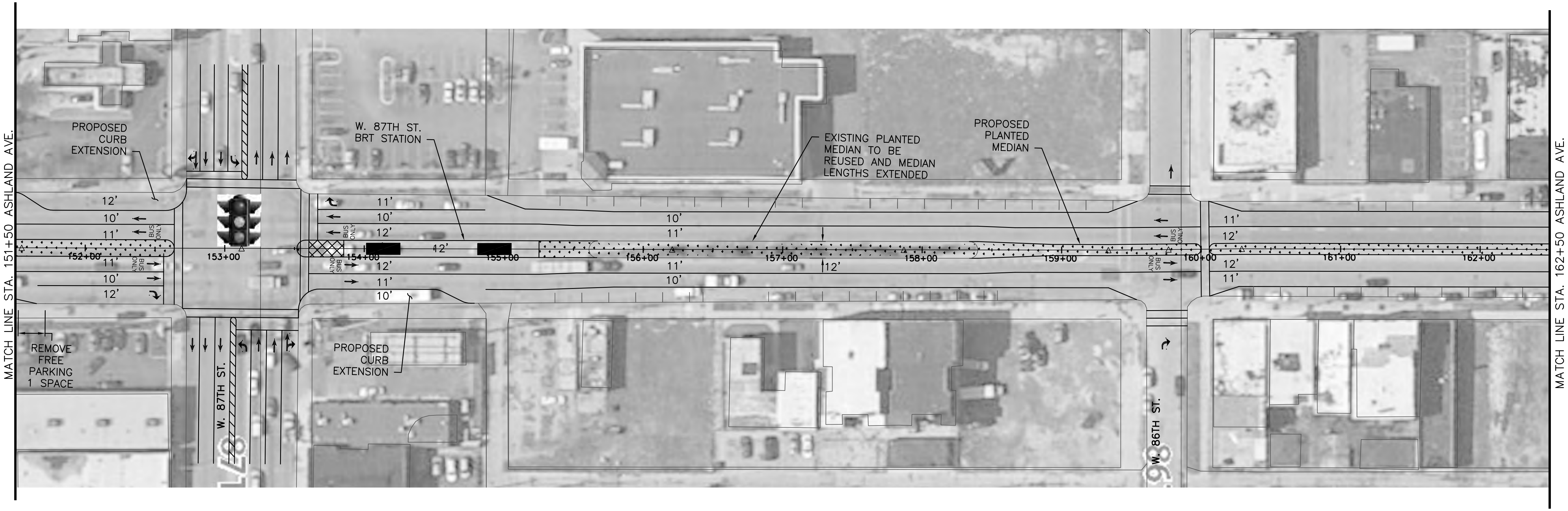
CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 118+50 TO STA. 140+50

ASHLAND AVE. BRT

5
45





N

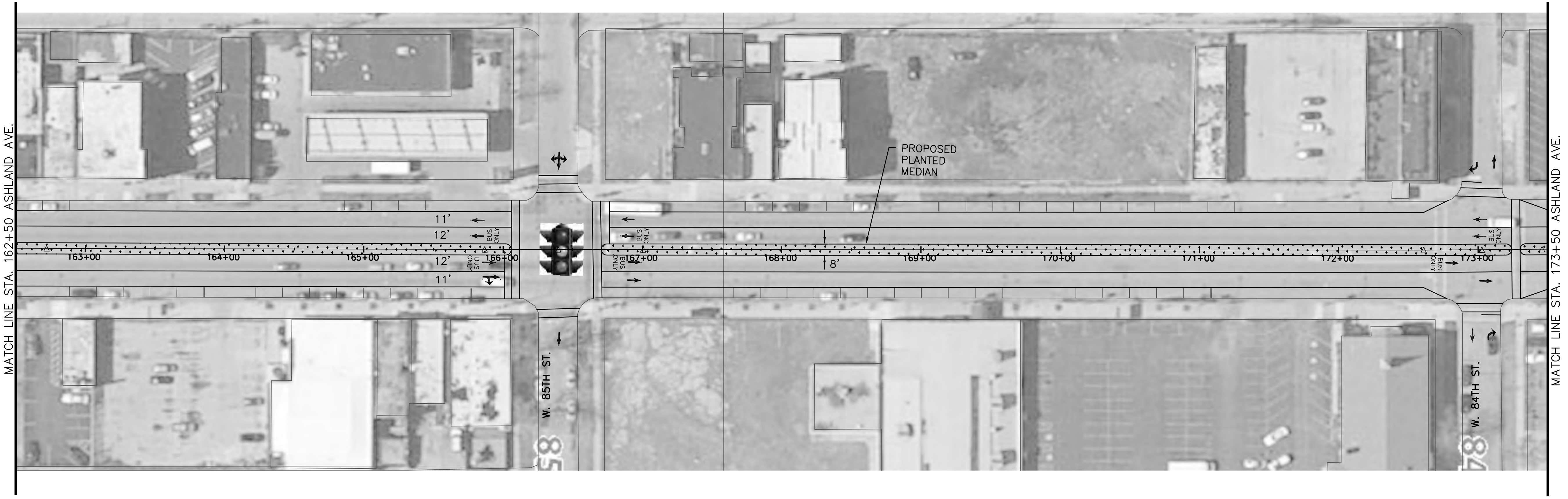
0 40 80
HORIZONTAL SCALE IN FEET

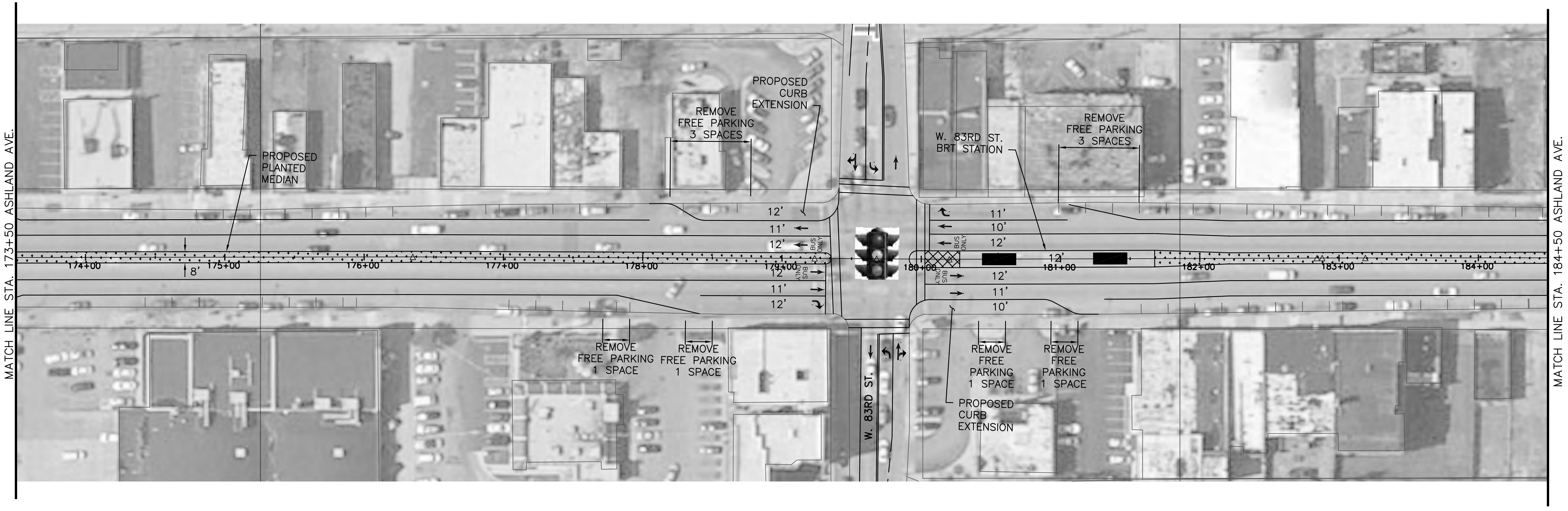
CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 140+50 TO STA. 162+50

ASHLAND AVE. BRT

6
45



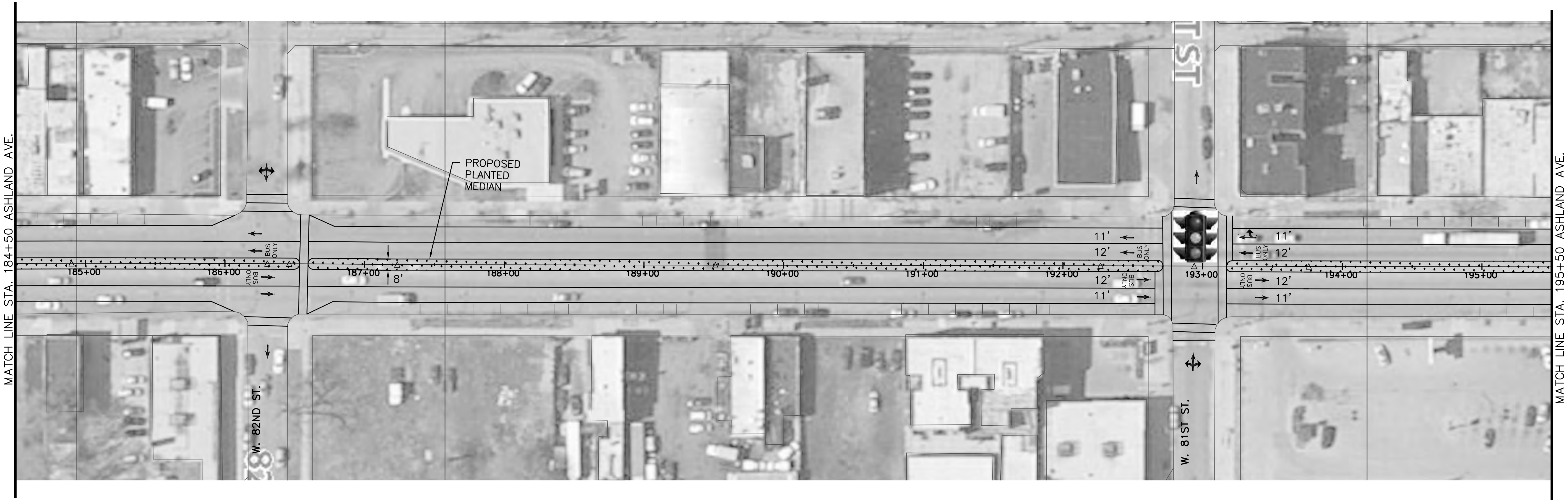

MATCH LINE STA. 173+50 ASHLAND AVE.
PROPOSED PLANTED MEDIAN
8'
174+00
175+00
176+00
177+00
178+00
179+00
180+00
181+00
182+00
183+00
184+00
REMOVE FREE PARKING 3 SPACES
PROPOSED CURB EXTENSION
12'
11'
12'
12'
11'
12'
BUS ONLY
REMOVE FREE PARKING 1 SPACE
REMOVE FREE PARKING 1 SPACE
W. 83RD ST.
W. 83RD ST. BRT STATION
REMOVE FREE PARKING 3 SPACES
11'
10'
12'
12'
12'
11'
10'
REMOVE FREE PARKING 1 SPACE
REMOVE FREE PARKING 1 SPACE
PROPOSED CURB EXTENSION
MATCH LINE STA. 184+50 ASHLAND AVE.

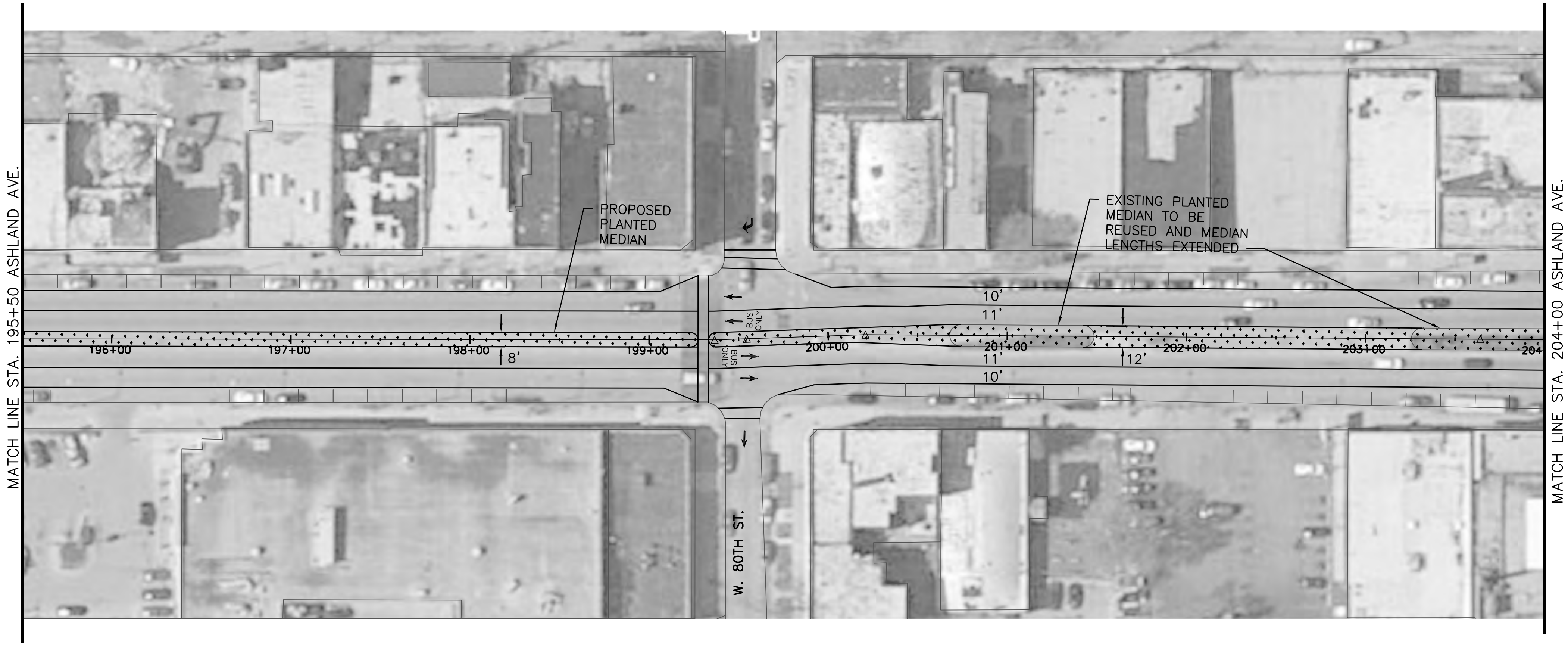
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN - ASHLAND AVENUE
STA. 162+50 TO STA. 184+50

ASHLAND AVE. BRT




MATCH LINE STA. 195+50 ASHLAND AVE.
PROPOSED PLANTED MEDIAN
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
BUS ONLY
196+00
197+00
198+00
199+00
200+00
201+00
202+00
203+00
204
8'
10'
11'
11'
10'
12'
W. 80TH ST.
MATCH LINE STA. 204+00 ASHLAND AVE.

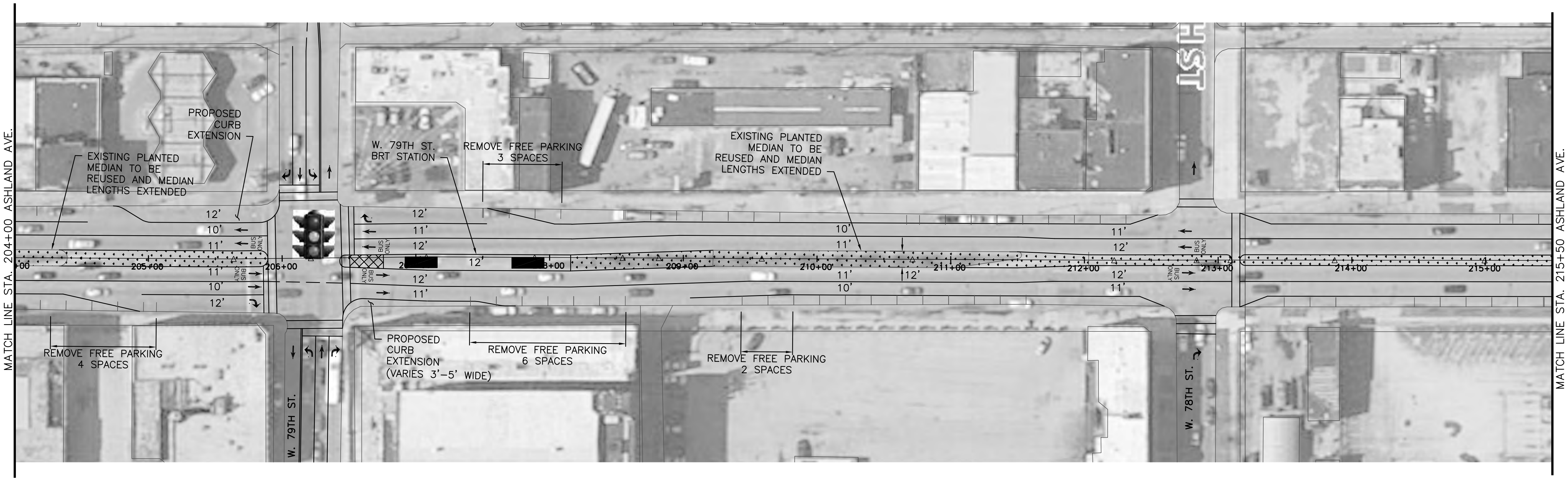
HORIZONTAL SCALE IN FEET
0 40 80

CALCULATED SMS
CHECKED SDG

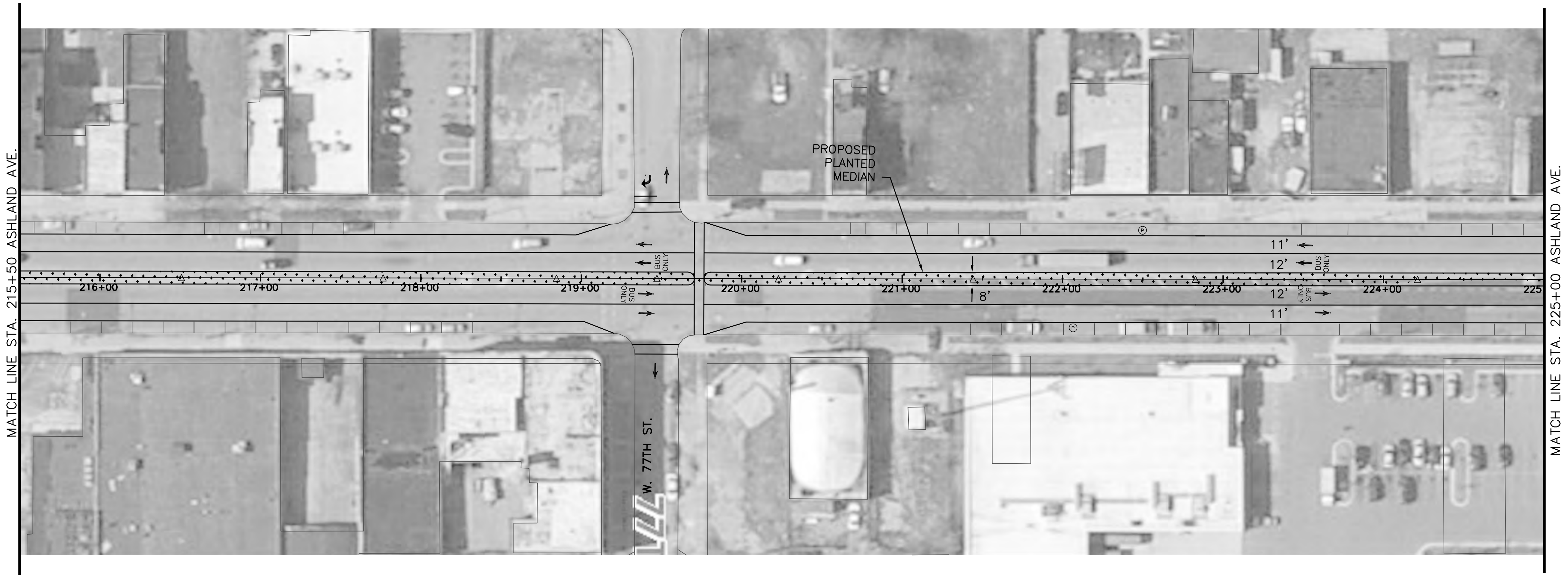
PLAN - ASHLAND AVENUE
STA. 184+50 TO STA. 204+00

ASHLAND AVE. BRT

8
45



MATCH LINE STA. 204+00 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED CURB EXTENSION
W. 79TH ST. BRT STATION
REMOVE FREE PARKING 3 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
REMOVE FREE PARKING 4 SPACES
PROPOSED CURB EXTENSION (VARIES 3'-5' WIDE)
REMOVE FREE PARKING 6 SPACES
REMOVE FREE PARKING 2 SPACES
W. 79TH ST.
W. 78TH ST.
BUS ONLY
12'
10'
11'
12'
11'
10'
12'
205+00
206+00
209+00
210+00
211+00
212+00
213+00
214+00
215+00
MATCH LINE STA. 215+50 ASHLAND AVE.



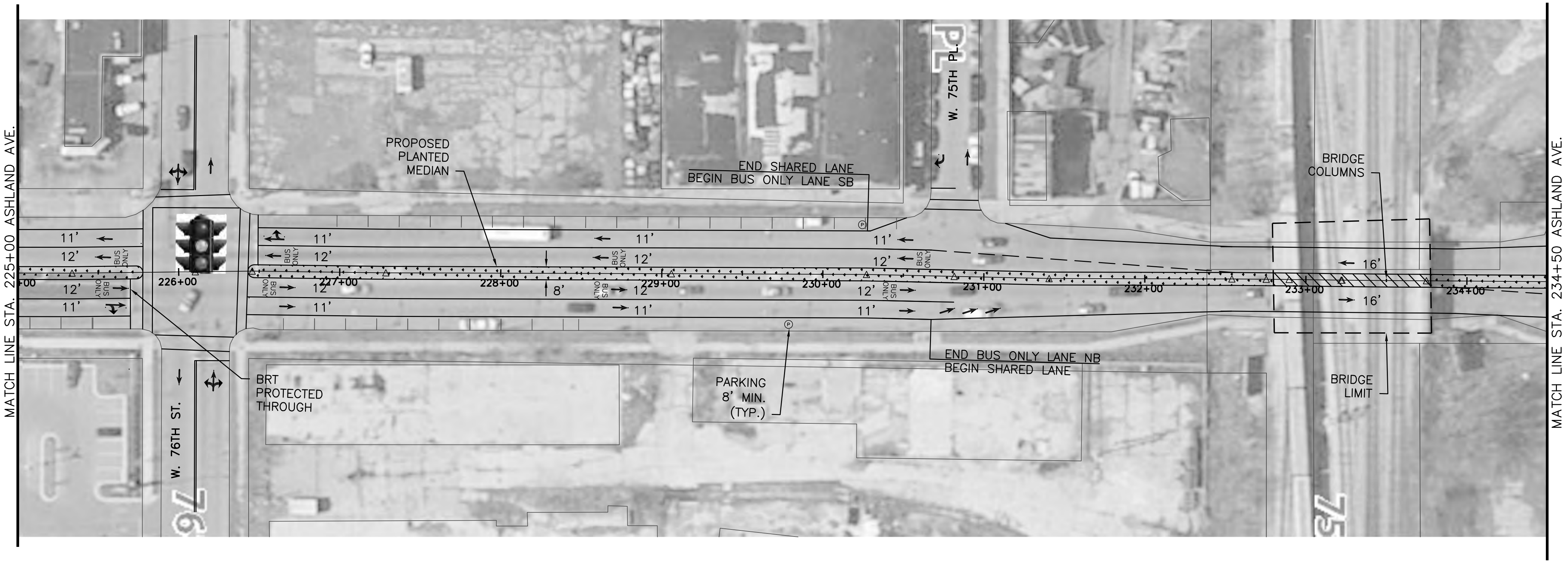
N

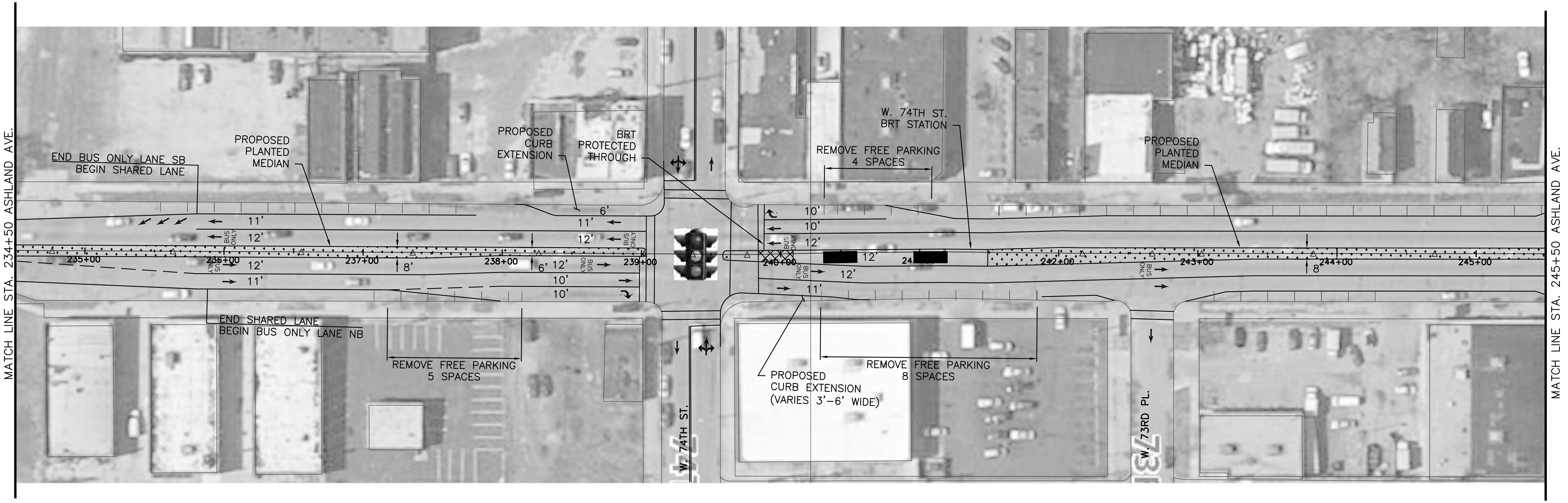
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS	CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 204+00 TO STA. 225+00

ASHLAND AVE. BRT




MATCH LINE STA. 234+50 ASHLAND AVE.
END BUS ONLY LANE SB BEGIN SHARED LANE
PROPOSED PLANTED MEDIAN
PROPOSED CURB EXTENSION
BRT PROTECTED THROUGH
W. 74TH ST. BRT STATION
REMOVE FREE PARKING 4 SPACES
PROPOSED PLANTED MEDIAN
MATCH LINE STA. 245+50 ASHLAND AVE.
6'
10'
11'
12'
8'
BUS ONLY
235+00
236+00
237+00
238+00
239+00
240+00
242+00
243+00
244+00
245+00
END SHARED LANE BEGIN BUS ONLY LANE NB
REMOVE FREE PARKING 5 SPACES
W. 74TH ST.
PROPOSED CURB EXTENSION (VARIES 3'-6' WIDE)
REMOVE FREE PARKING 8 SPACES
W. 73RD PL.

N

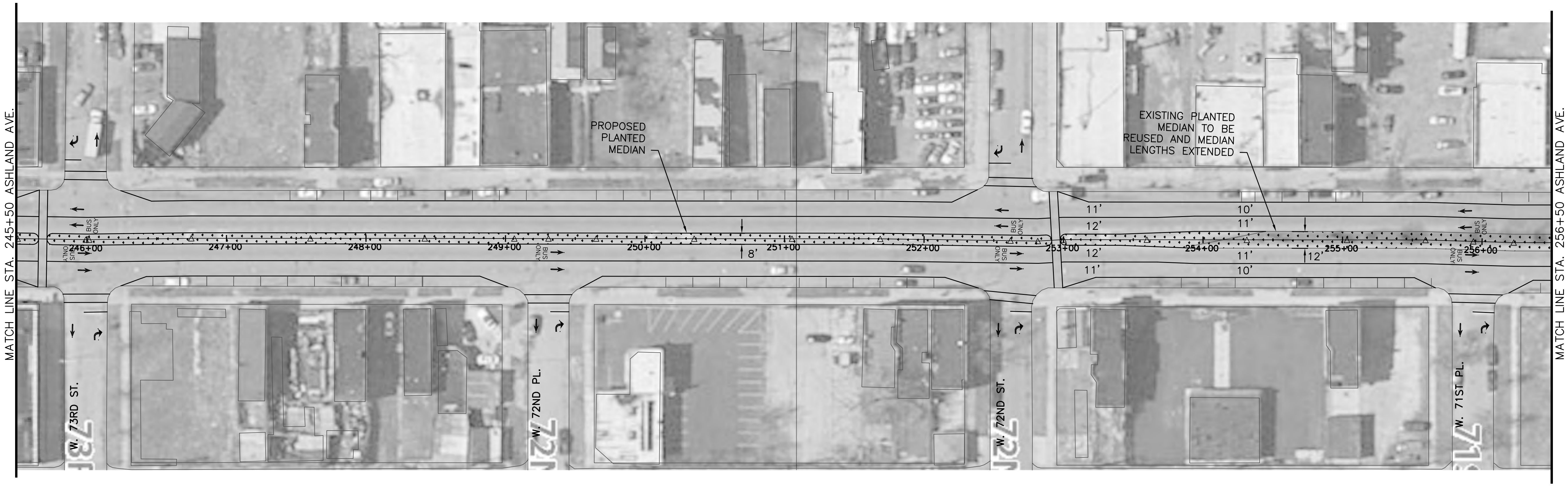
0 40 80
HORIZONTAL SCALE IN FEET

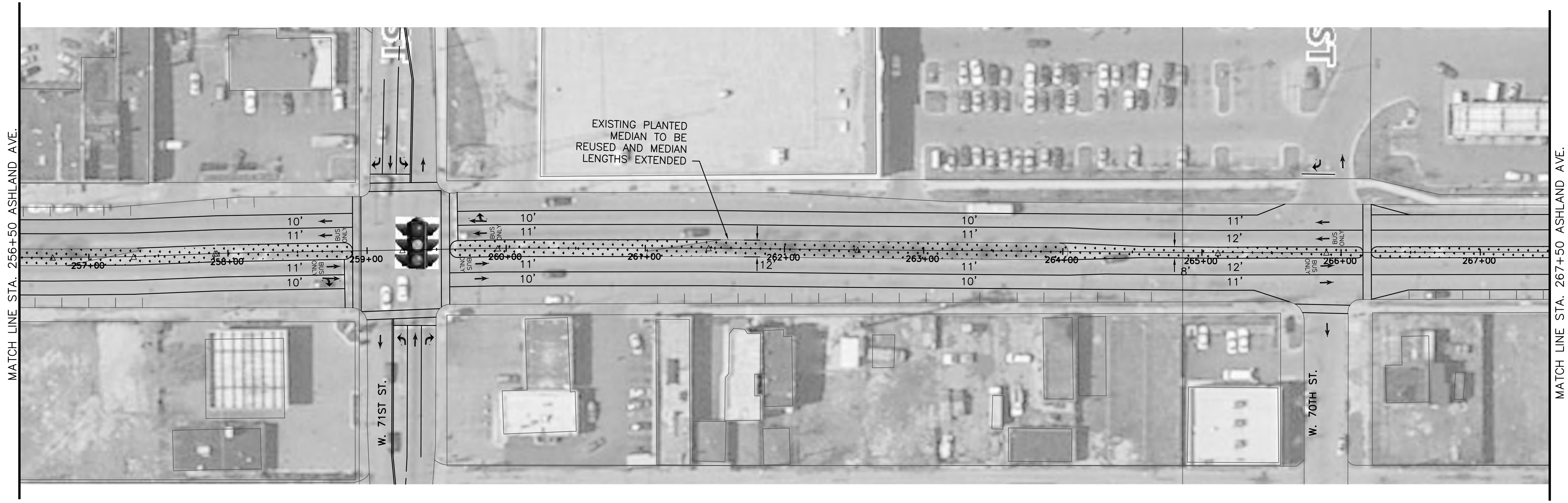
CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 225+00 TO STA. 245+50

ASHLAND AVE. BRT

10
45




MATCH LINE STA. 256+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
BUS ONLY
257+00
258+00
259+00
260+00
261+00
262+00
263+00
264+00
265+00
266+00
267+00
10'
11'
12'
8'
W. 71ST ST.
W. 70TH ST.
MATCH LINE STA. 267+50 ASHLAND AVE.

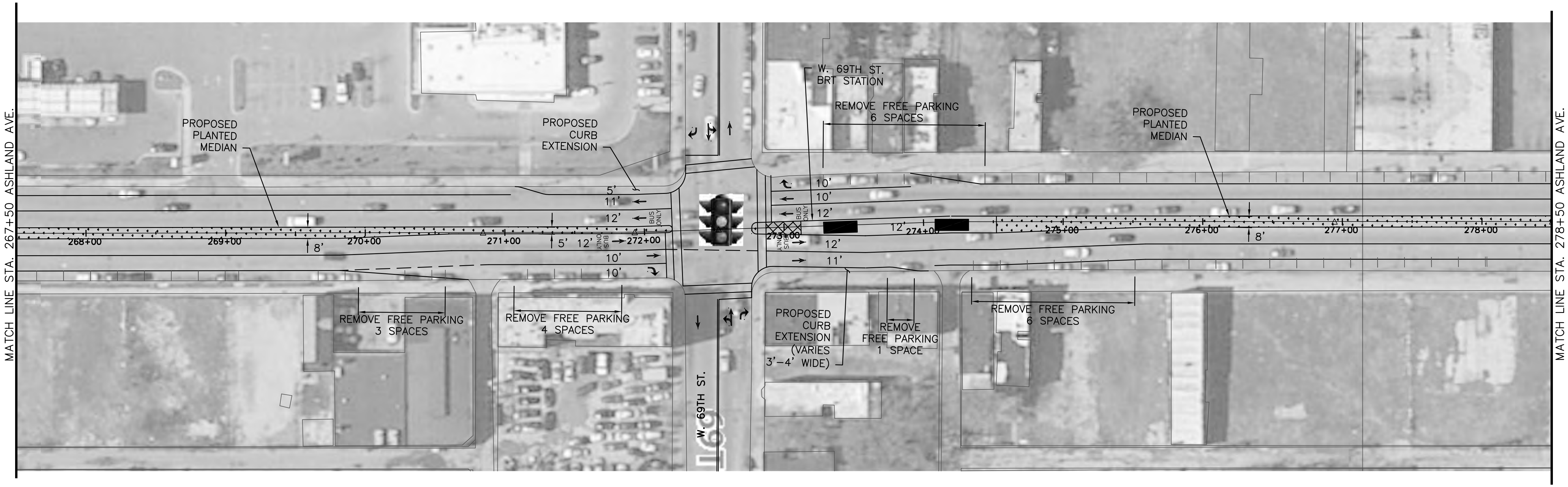
HORIZONTAL SCALE IN FEET
0 40 80

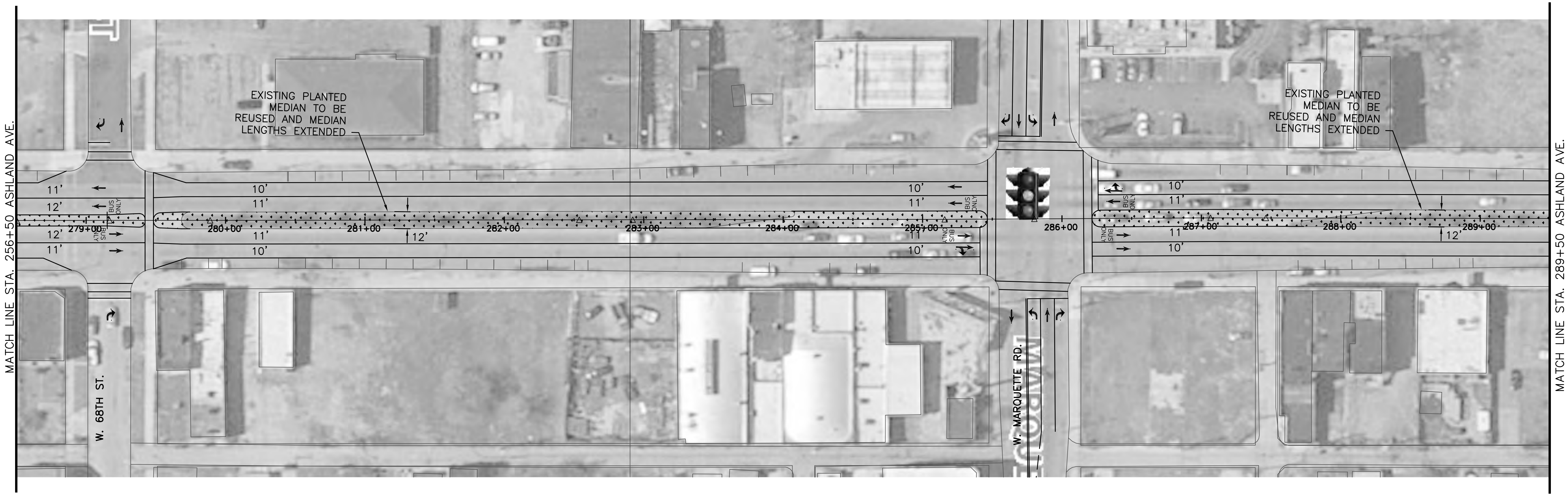
CALCULATED SMS

CHECKED SDG

PLAN - ASHLAND AVENUE
STA. 245+50 TO STA. 267+50

ASHLAND AVE. BRT


MATCH LINE STA. 267+50 ASHLAND AVE.
PROPOSED PLANTED MEDIAN
PROPOSED CURB EXTENSION
W. 69TH ST. BRT STATION
REMOVE FREE PARKING 6 SPACES
PROPOSED PLANTED MEDIAN
MATCH LINE STA. 278+50 ASHLAND AVE.
5'
11'
12'
BUS ONLY
8'
5'
12'
BUS ONLY
10'
10'
10'
10'
12'
12'
12'
11'
8'
268+00
269+00
270+00
271+00
272+00
273+00
274+00
275+00
276+00
277+00
278+00
REMOVE FREE PARKING 3 SPACES
REMOVE FREE PARKING 4 SPACES
W. 69TH ST.
PROPOSED CURB EXTENSION (VARIES 3'-4' WIDE)
REMOVE FREE PARKING 1 SPACE
REMOVE FREE PARKING 6 SPACES

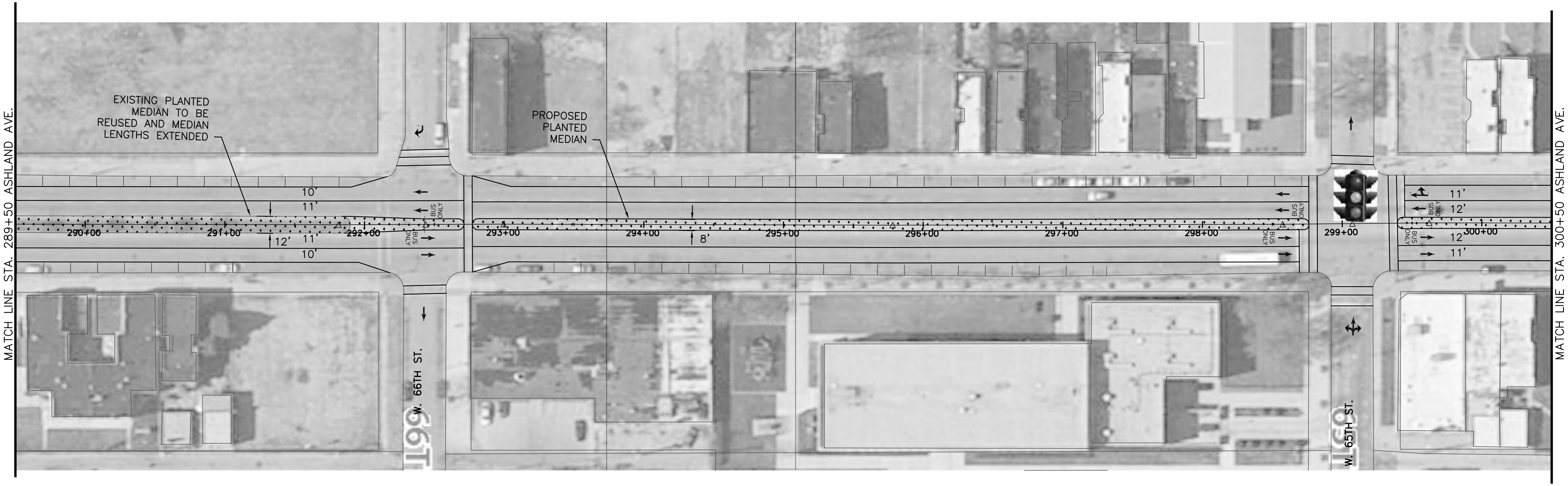

MATCH LINE STA. 256+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
MATCH LINE STA. 289+50 ASHLAND AVE.
11'
12'
12'
11'
BUS ONLY
10'
11'
11'
10'
12'
10'
11'
BUS ONLY
11'
10'
10'
11'
BUS ONLY
11'
10'
12'
279+00
280+00
281+00
282+00
283+00
284+00
285+00
286+00
287+00
288+00
289+00
W. 68TH ST.
W. MARQUETTE RD.

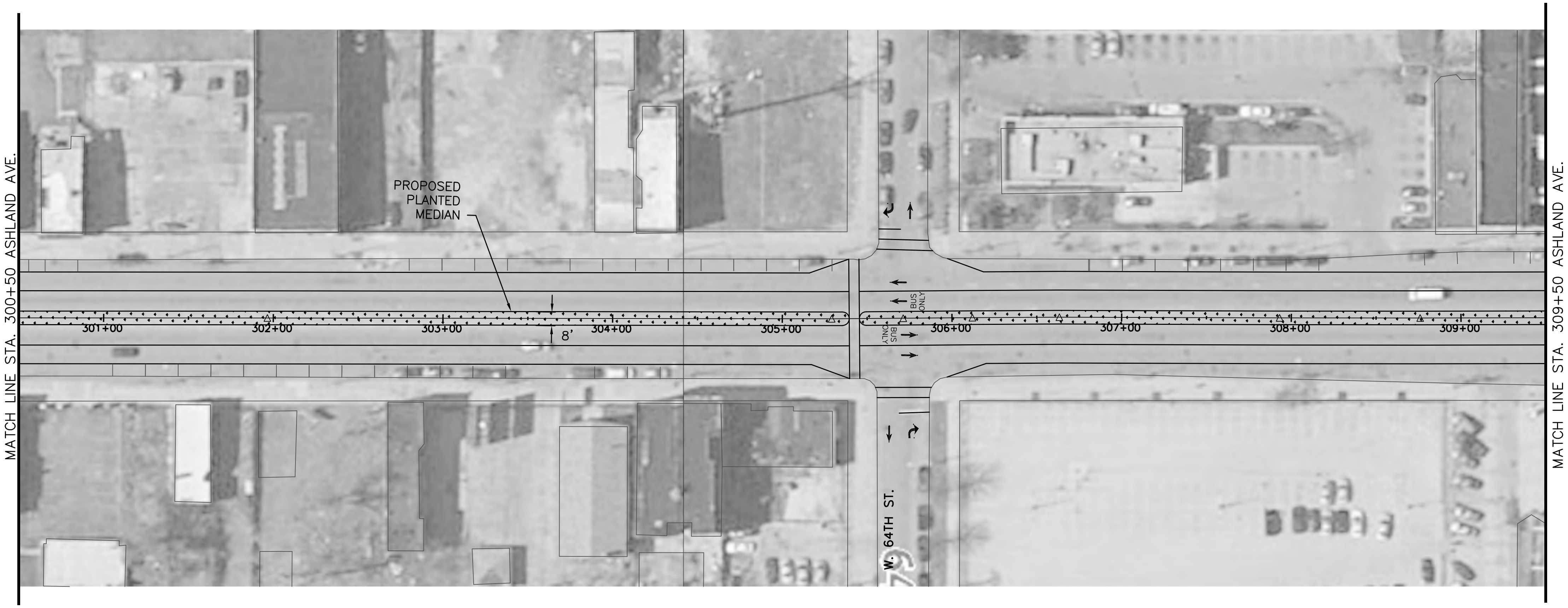
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 267+50 TO STA. 289+50

ASHLAND AVE. BRT

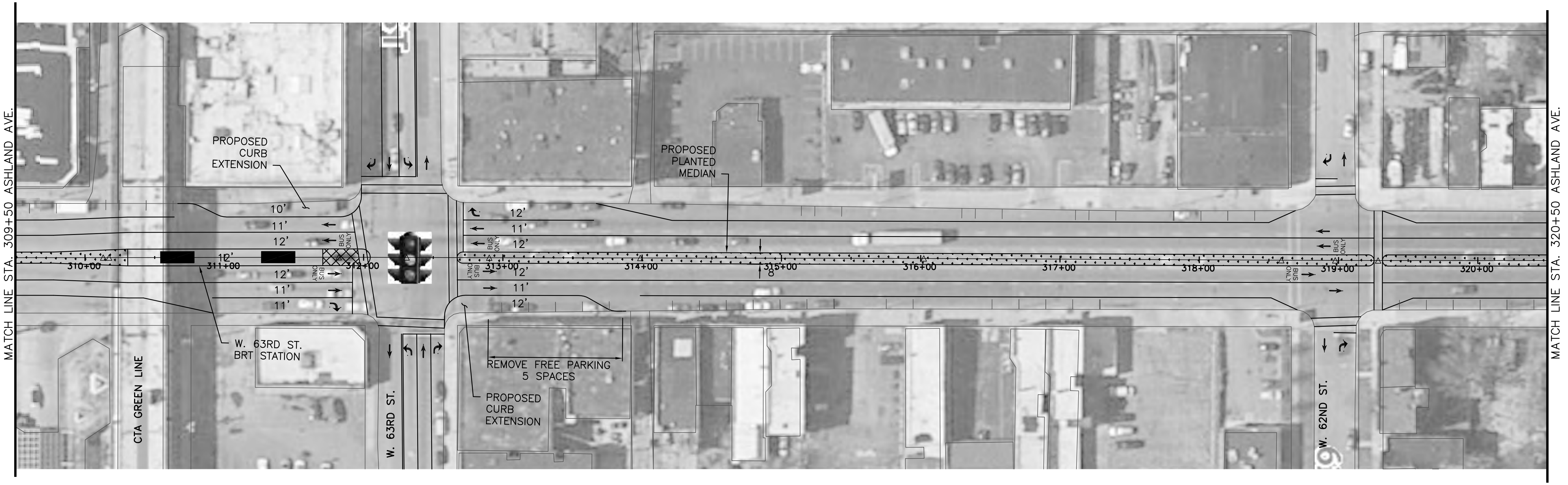


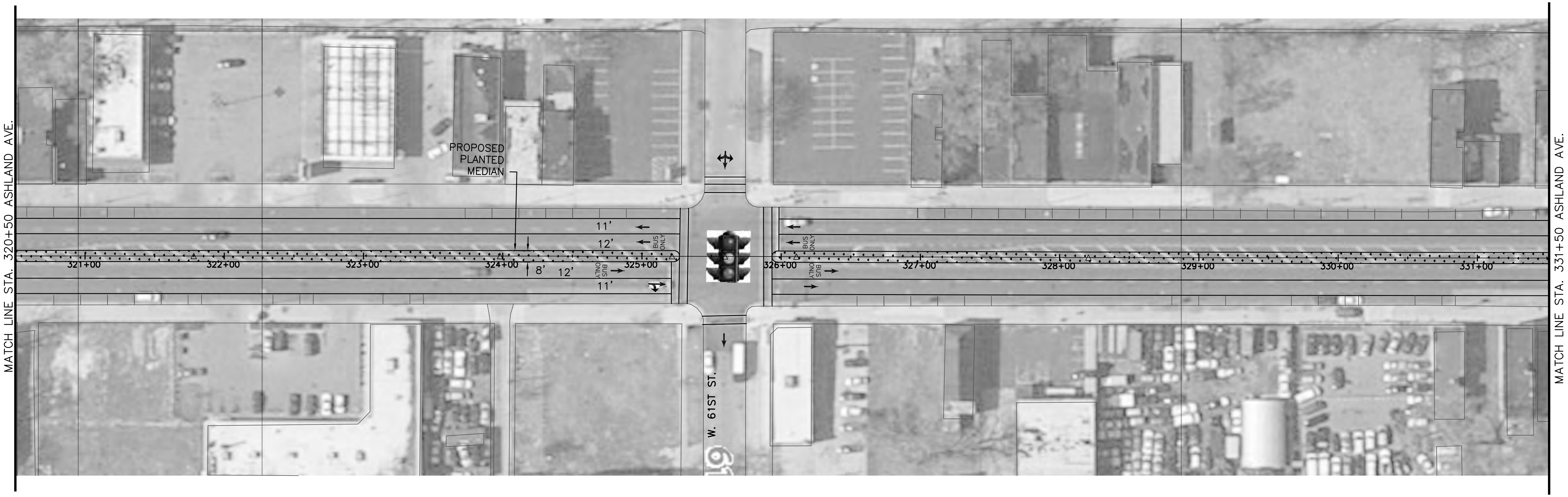


CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 289+50 TO STA. 309+50

ASHLAND AVE. BRT



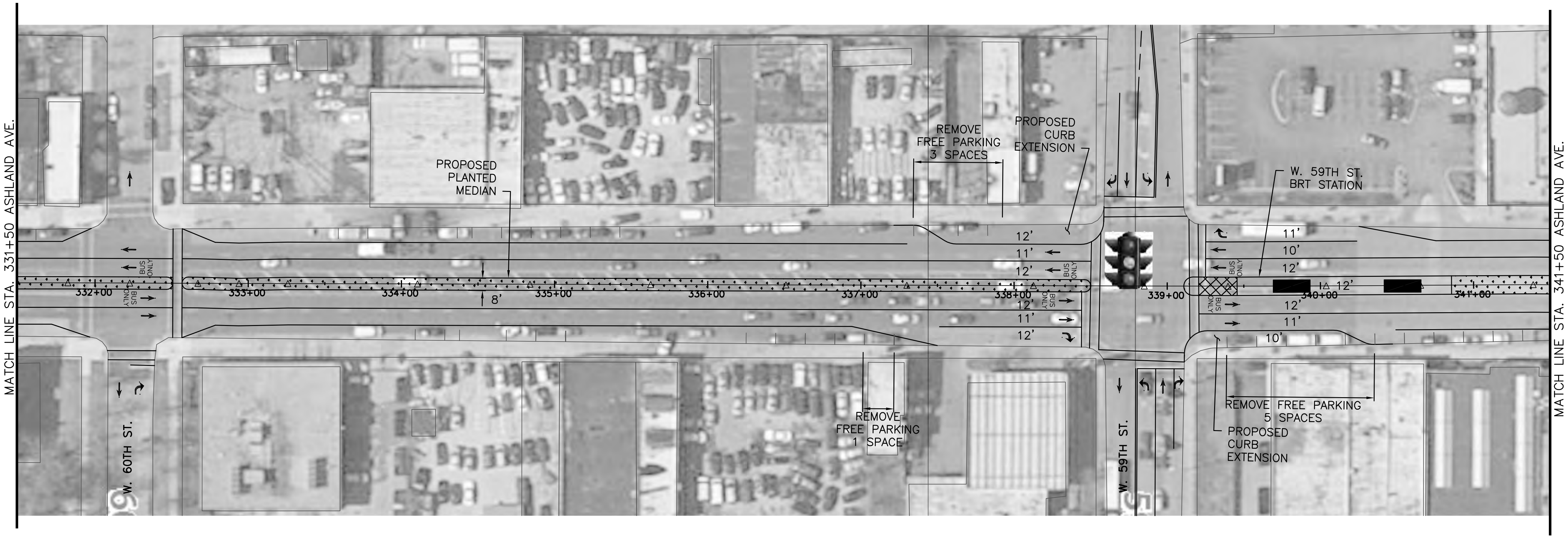


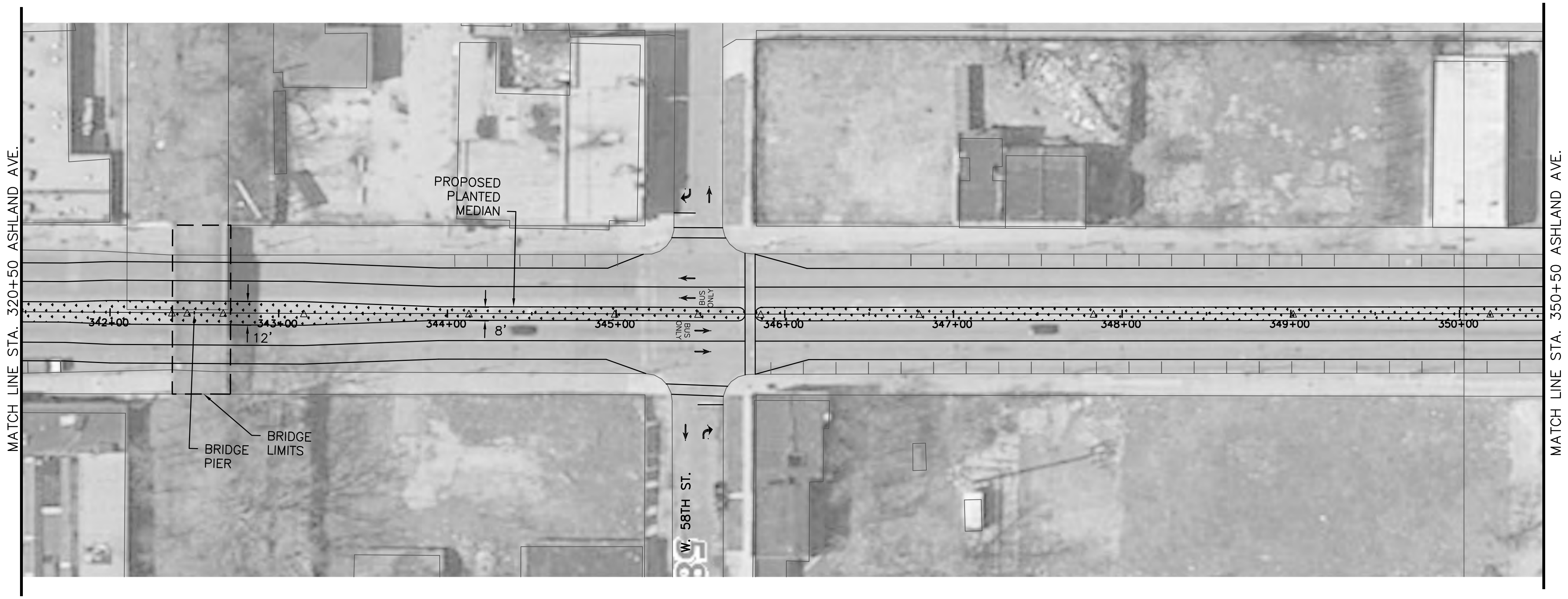
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 309+50 TO STA. 331+50

ASHLAND AVE. BRT





N

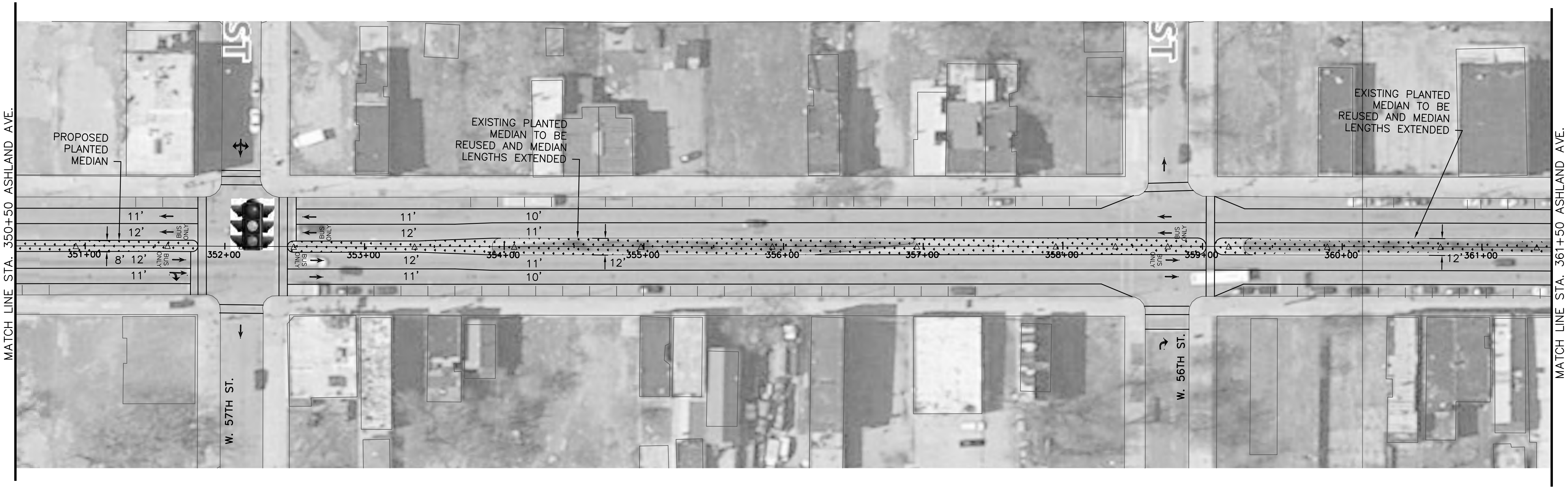
0 40 80
HORIZONTAL SCALE IN FEET

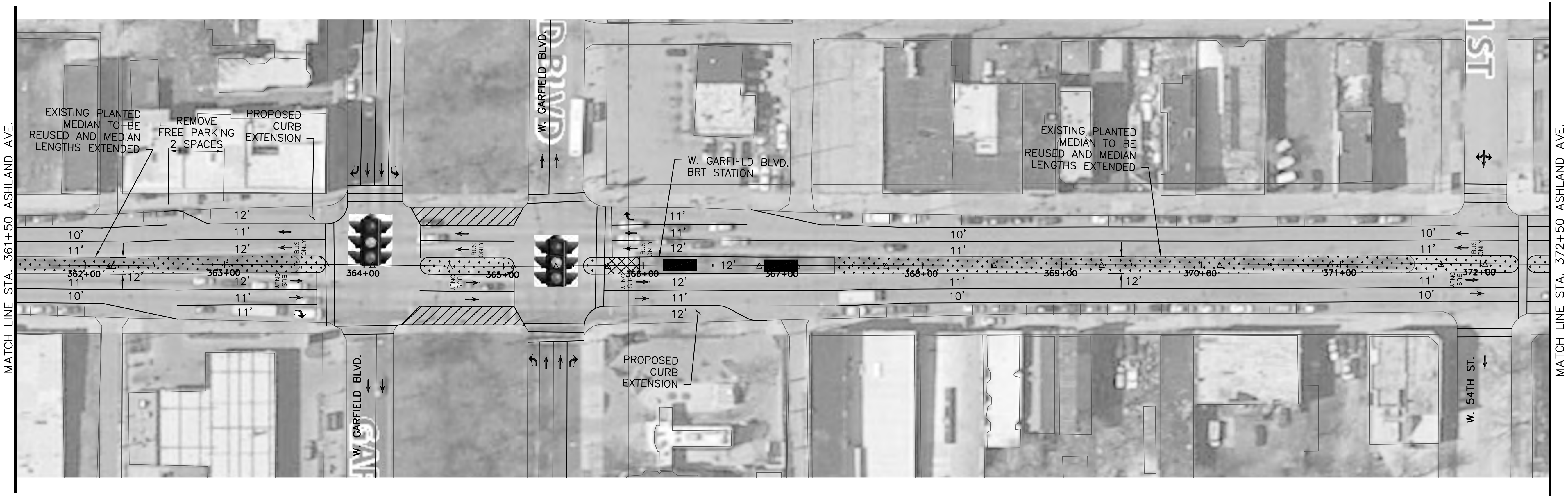
CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 331+50 TO STA. 350+50

ASHLAND AVE. BRT

15
45


MATCH LINE STA. 350+50 ASHLAND AVE.
PROPOSED PLANTED MEDIAN
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
MATCH LINE STA. 361+50 ASHLAND AVE.
11'
12'
8'
12'
11'
11'
12'
12'
11'
10'
11'
11'
10'
12'
12'
351+00
352+00
353+00
354+00
355+00
356+00
357+00
358+00
359+00
360+00
361+00
BUS ONLY
W. 57TH ST.
W. 56TH ST.
ST
ST


MATCH LINE STA. 361+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
REMOVE FREE PARKING 2 SPACES
PROPOSED CURB EXTENSION
W. GARFIELD BLVD.
W. GARFIELD BLVD. BRT STATION
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED CURB EXTENSION
W. GARFIELD BLVD.
W. 54TH ST.
MATCH LINE STA. 372+50 ASHLAND AVE.
10'
11'
12'
11'
12'
12'
11'
10'
11'
11'
11'
12'
12'
12'
11'
12'
10'
11'
11'
10'
10'
11'
11'
10'
362+00
363+00
364+00
365+00
366+00
367+00
368+00
369+00
370+00
371+00
372+00
BUS ONLY
ST

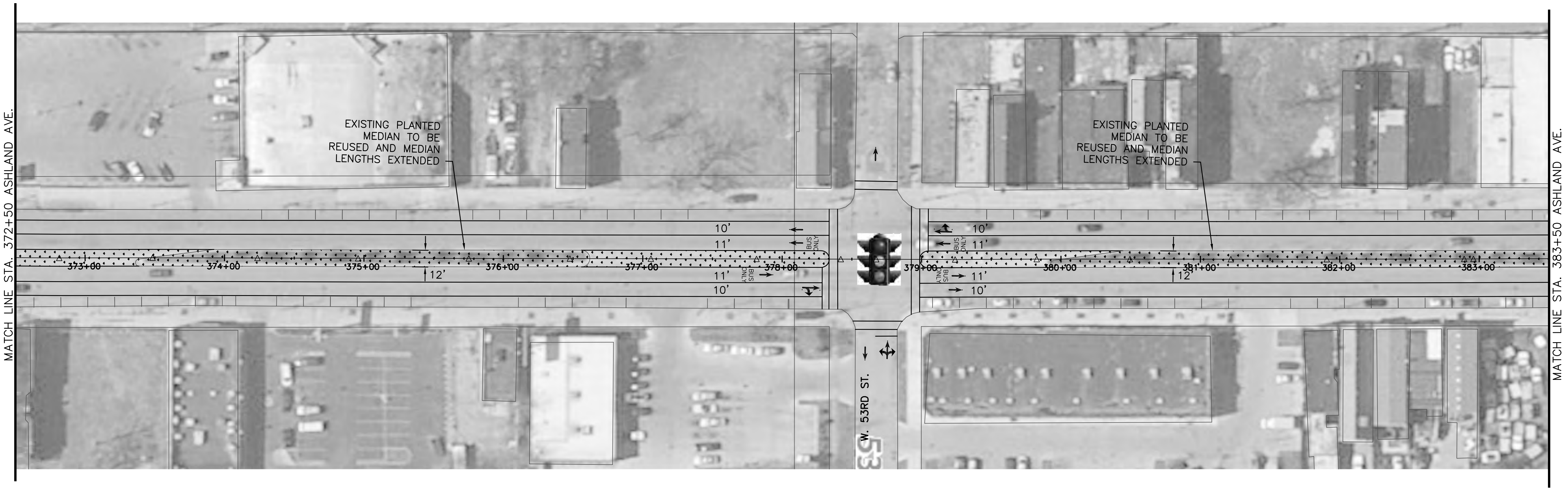
HORIZONTAL SCALE IN FEET
0 40 80

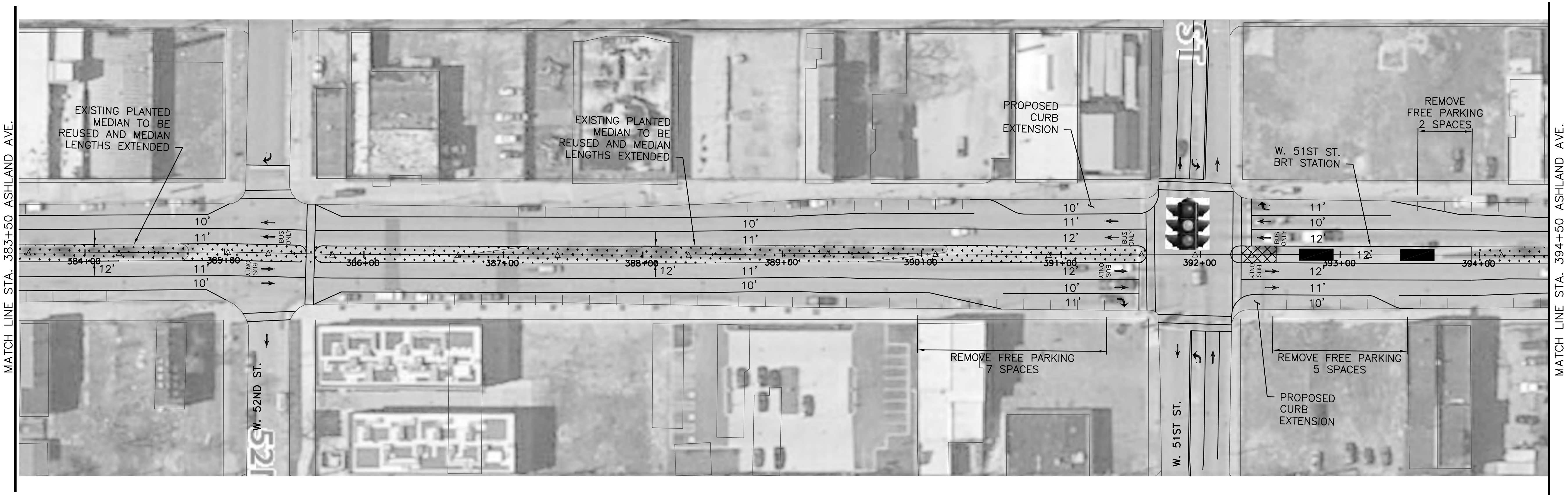
CALCULATED SMS

CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 350+50 TO STA. 372+50

ASHLAND AVE. BRT


MATCH LINE STA. 372+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
10'
11'
12'
11'
10'
BUS ONLY
BUS ONLY
373+00
374+00
375+00
376+00
377+00
378+00
379+00
380+00
381+00
382+00
383+00
W. 53RD ST.
MATCH LINE STA. 383+50 ASHLAND AVE.


MATCH LINE STA. 383+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED CURB EXTENSION
REMOVE FREE PARKING 2 SPACES
W. 51ST ST. BRT STATION
10'
11'
12'
11'
10'
BUS ONLY
384+00
385+00
386+00
387+00
388+00
389+00
390+00
391+00
392+00
393+00
394+00
W. 52ND ST.
REMOVE FREE PARKING 7 SPACES
W. 51ST ST.
REMOVE FREE PARKING 5 SPACES
PROPOSED CURB EXTENSION
MATCH LINE STA. 394+50 ASHLAND AVE.

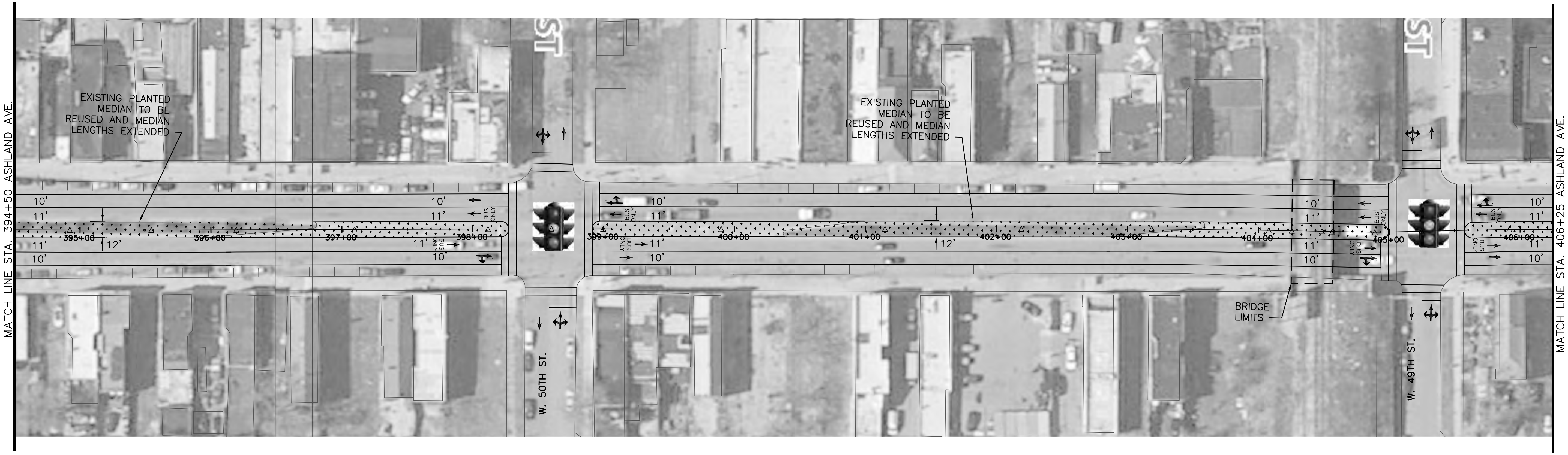
N

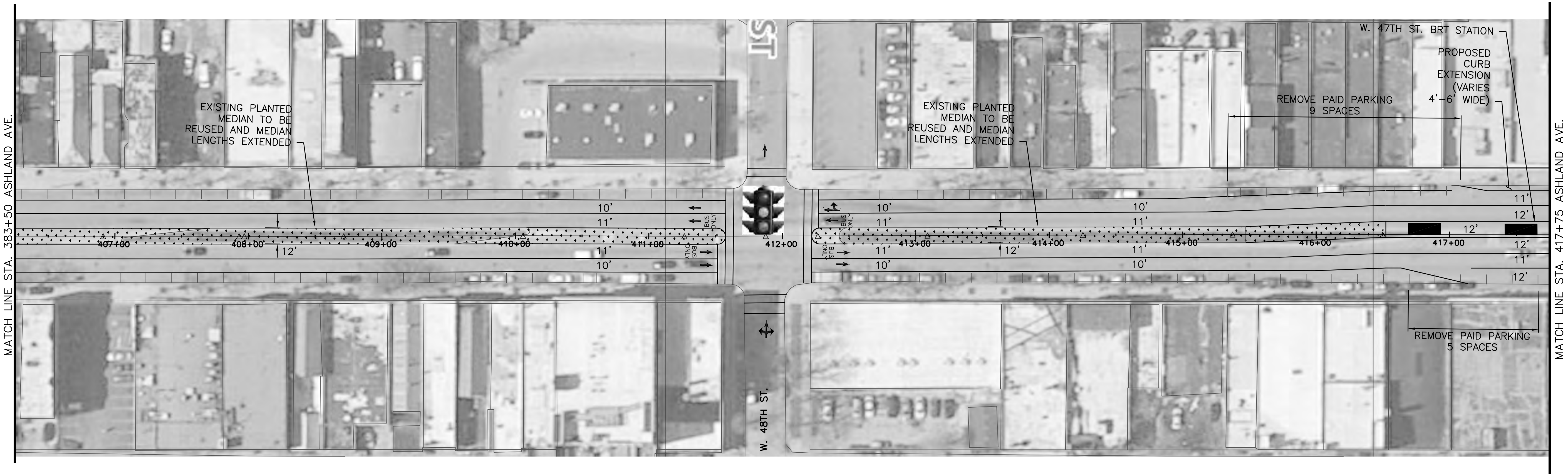
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 372+50 TO STA. 394+50

ASHLAND AVE. BRT


MATCH LINE STA. 394+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
10'
11'
12'
11'
10'
BUS ONLY
395+00
396+00
397+00
398+00
399+00
400+00
401+00
402+00
403+00
404+00
405+00
406+00
ST
W. 50TH ST.
BRIDGE LIMITS
W. 49TH ST.
MATCH LINE STA. 406+25 ASHLAND AVE.


MATCH LINE STA. 383+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
10'
11'
12'
11'
10'
BUS ONLY
407+00
408+00
409+00
410+00
411+00
412+00
413+00
414+00
415+00
416+00
417+00
ST
W. 48TH ST.
W. 47TH ST. BRT STATION
PROPOSED CURB EXTENSION (VARIES 4'-6' WIDE)
REMOVE PAID PARKING 9 SPACES
REMOVE PAID PARKING 5 SPACES
MATCH LINE STA. 417+75 ASHLAND AVE.

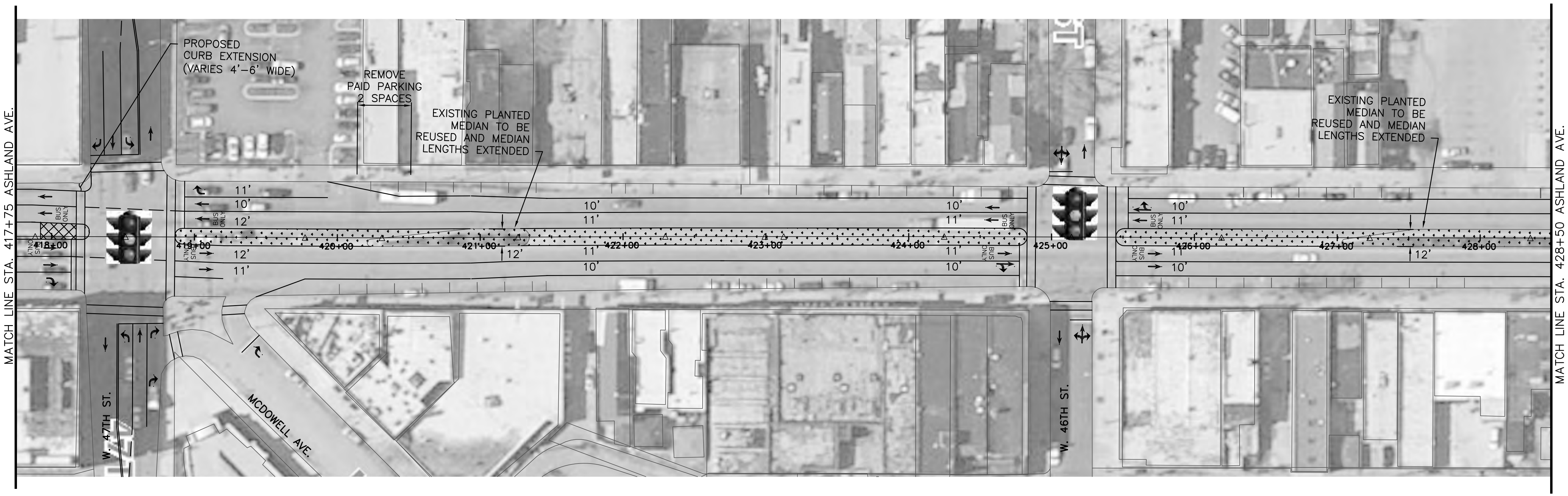
N

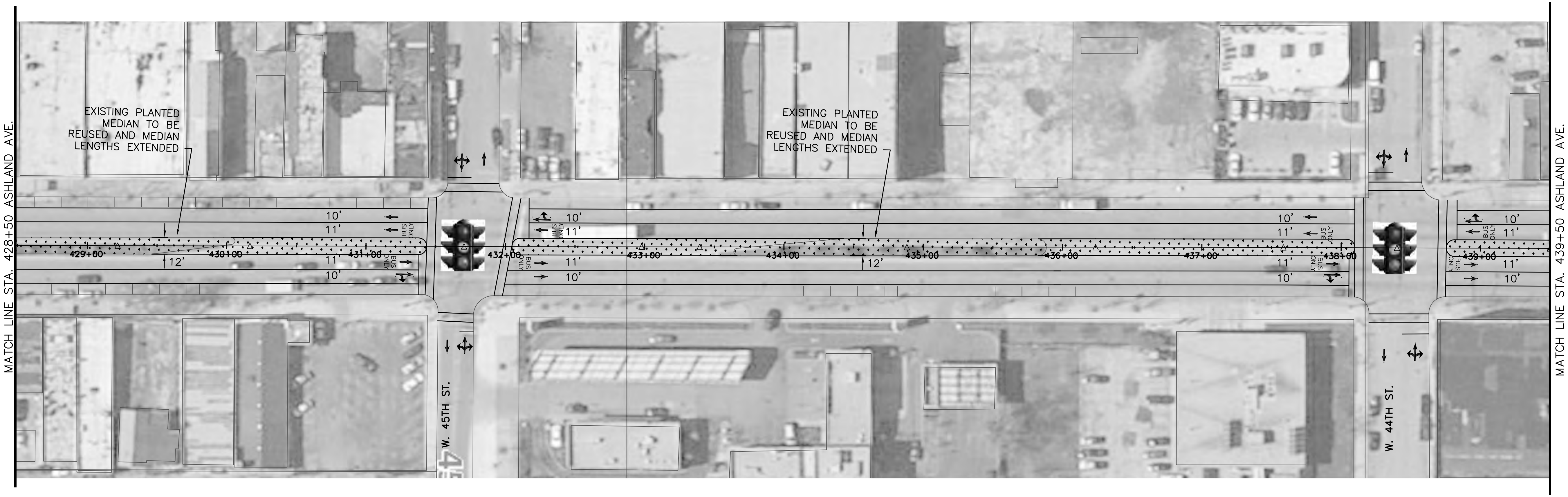
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 394+50 TO STA. 417+75

ASHLAND AVE. BRT


MATCH LINE STA. 417+75 ASHLAND AVE.
PROPOSED CURB EXTENSION (VARIES 4'-6' WIDE)
REMOVE PAID PARKING 2 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
BUS ONLY
418+00
419+00
420+00
421+00
422+00
423+00
424+00
425+00
426+00
427+00
428+00
11'
10'
12'
12'
11'
10'
W. 47TH ST.
MCDOWELL AVE.
W. 46TH ST.
MATCH LINE STA. 428+50 ASHLAND AVE.

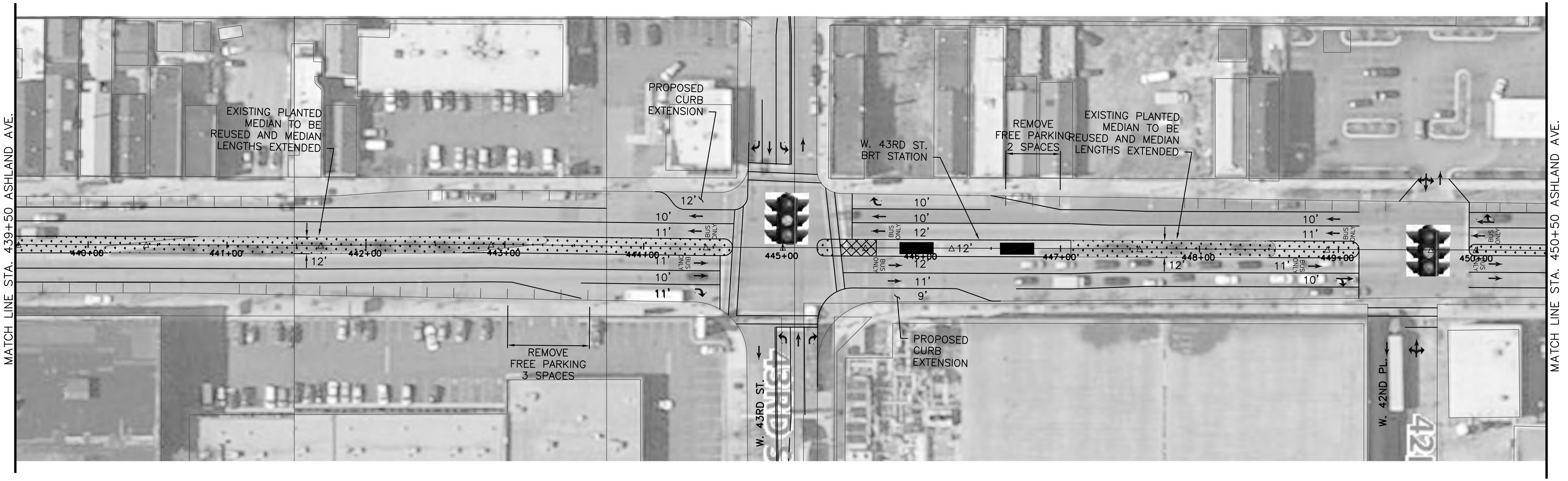

MATCH LINE STA. 428+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
BUS ONLY
429+00
430+00
431+00
432+00
433+00
434+00
435+00
436+00
437+00
438+00
439+00
10'
11'
12'
11'
10'
W. 45TH ST.
W. 44TH ST.
MATCH LINE STA. 439+50 ASHLAND AVE.

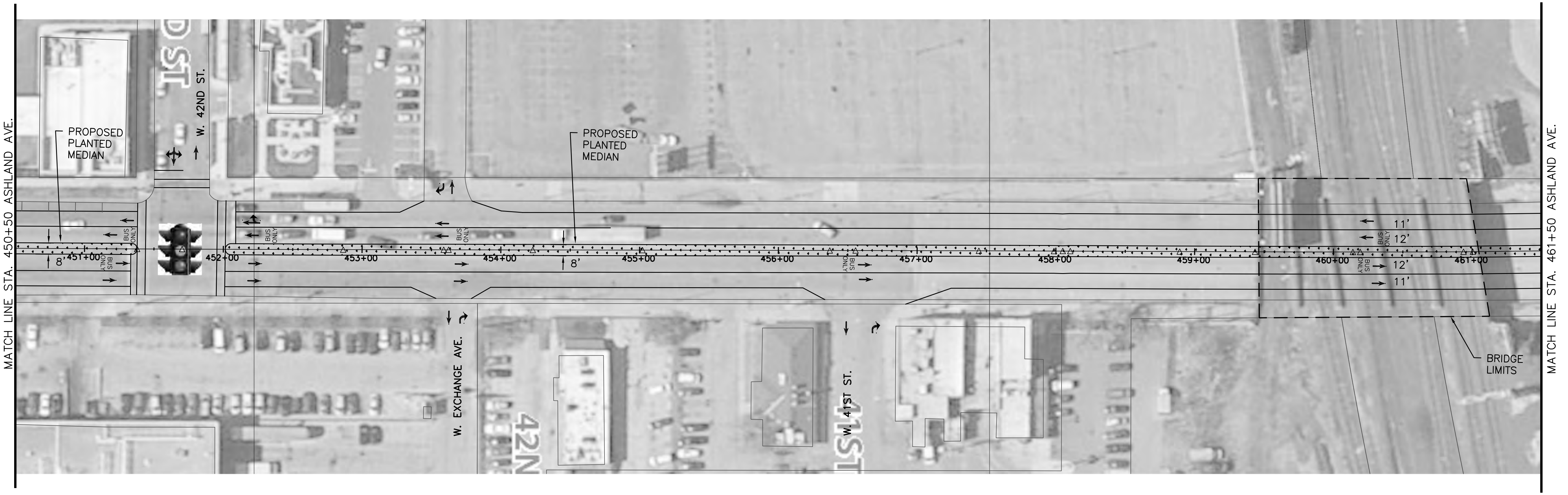
HORIZONTAL SCALE IN FEET
0 40 80

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 417+75 TO STA. 439+50

ASHLAND AVE. BRT


MATCH LINE STA. 439+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED CURB EXTENSION
REMOVE FREE PARKING 3 SPACES
W. 43RD ST.
W. 43RD ST. BRT STATION
REMOVE FREE PARKING 2 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED CURB EXTENSION
W. 42ND PL.
MATCH LINE STA. 450+50 ASHLAND AVE.
440+00
441+00
442+00
443+00
444+00
445+00
446+00
447+00
448+00
449+00
450+00
12'
10'
11'
12'
11'
10'
11'
10'
10'
12'
12'
11'
9'
12'
10'
11'
12'
11'
10'
BUS ONLY

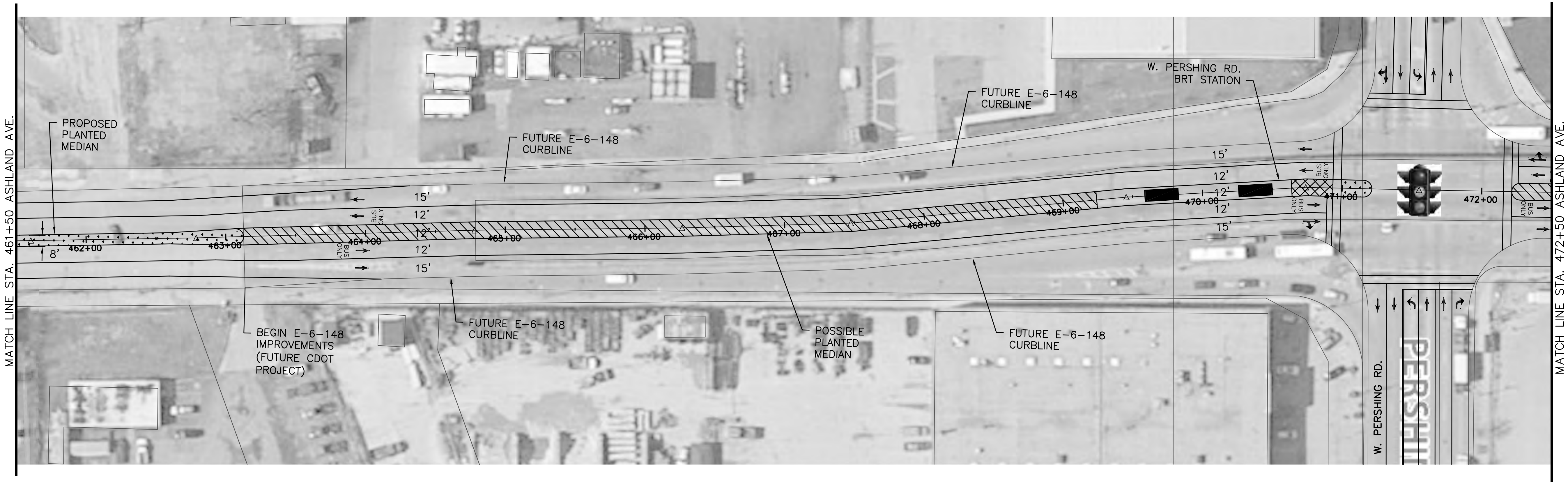


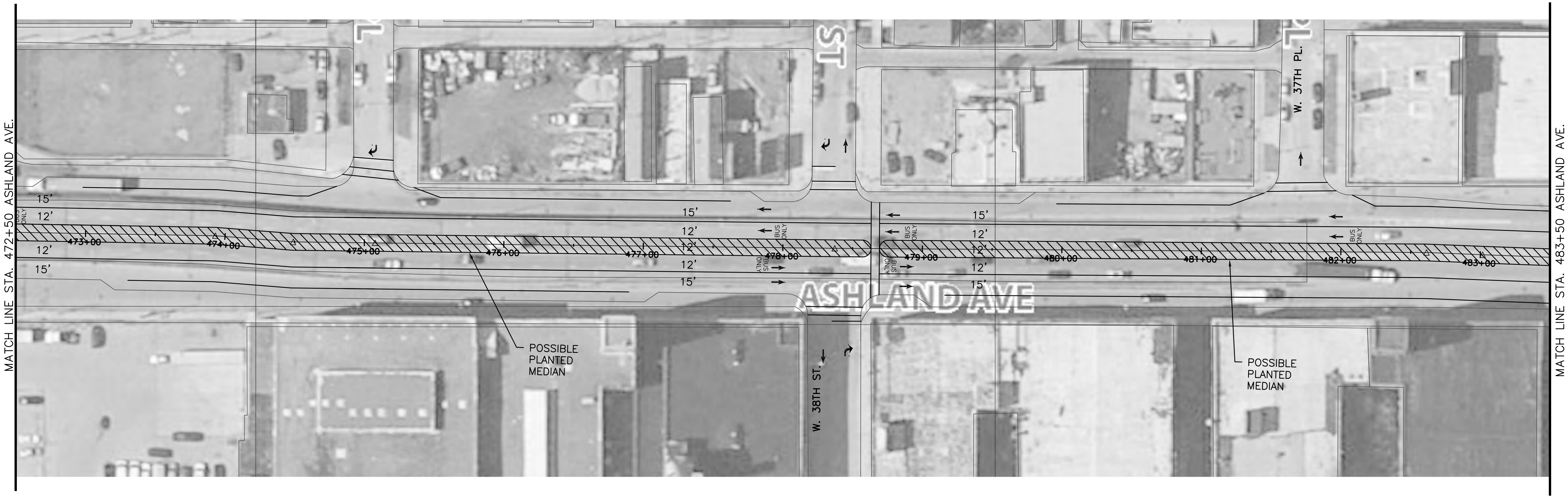
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 438+50 TO STA. 461+50

ASHLAND AVE. BRT

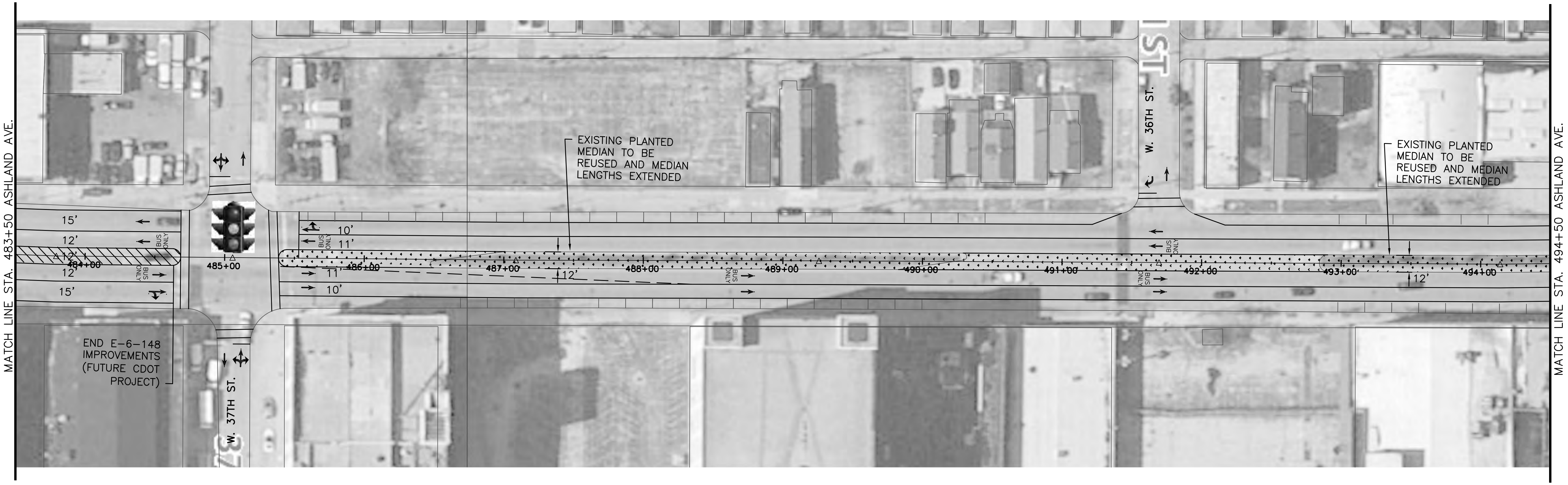


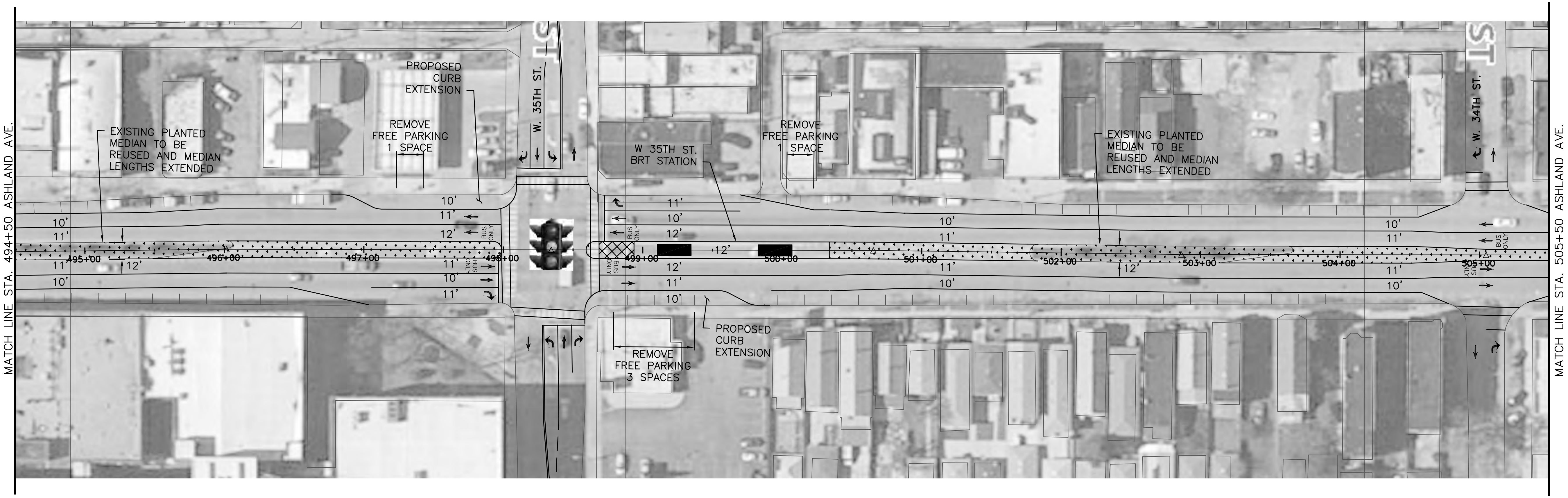


CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 461+50 TO STA. 483+50

ASHLAND AVE. BRT





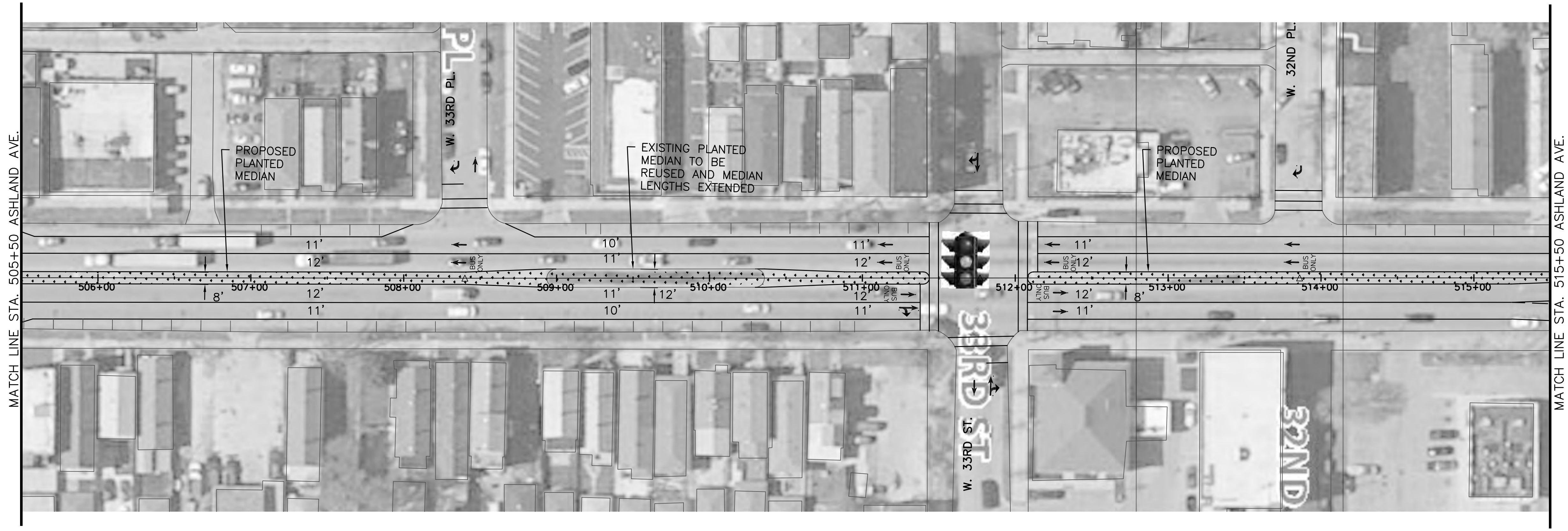
0 40 80
HORIZONTAL SCALE
IN FEET

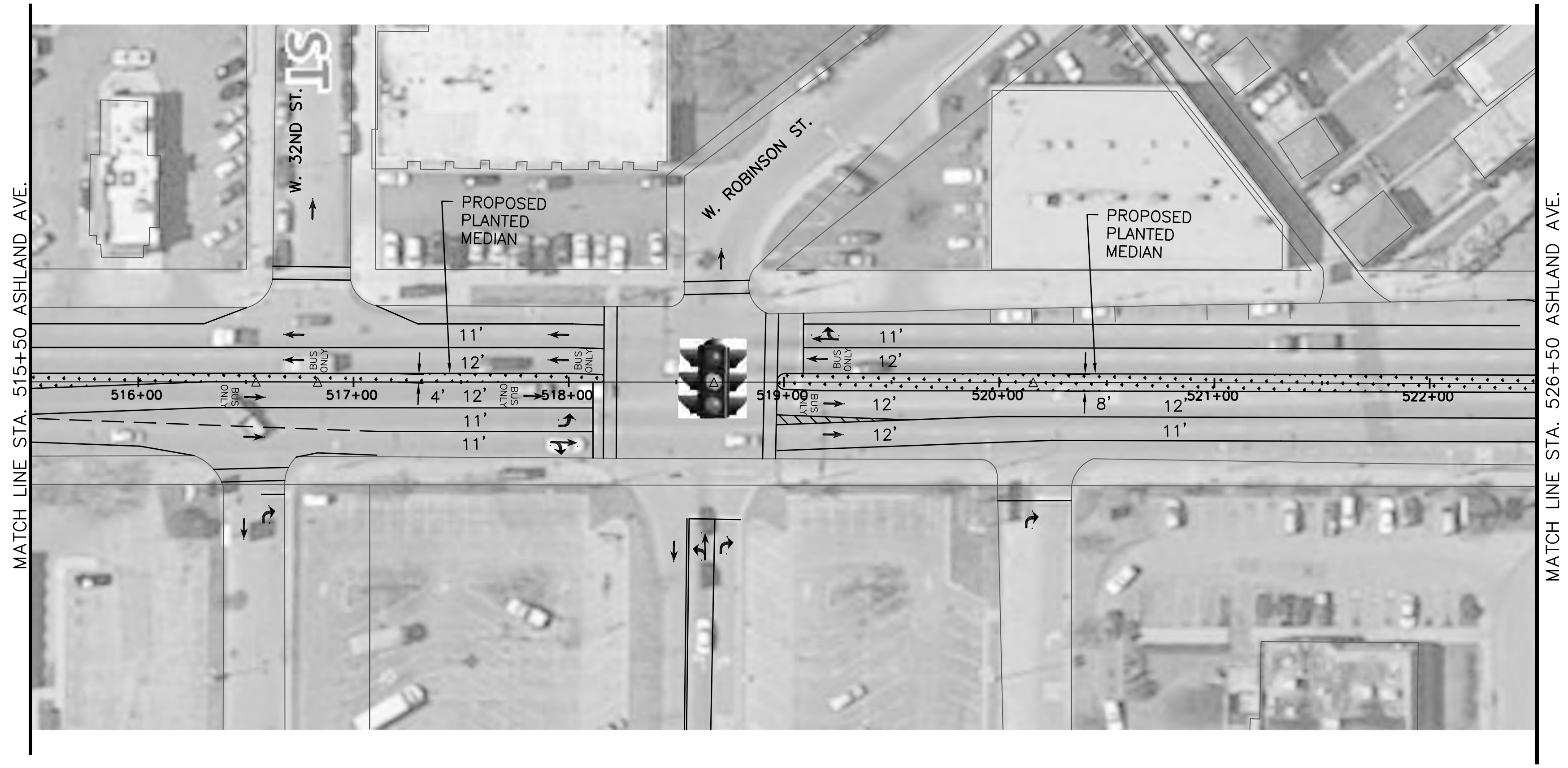
CALCULATED
SMS

CHECKED
SDG

PLAN – ASHLAND AVENUE
STA. 483+50 TO STA. 505+50

ASHLAND AVE. BRT





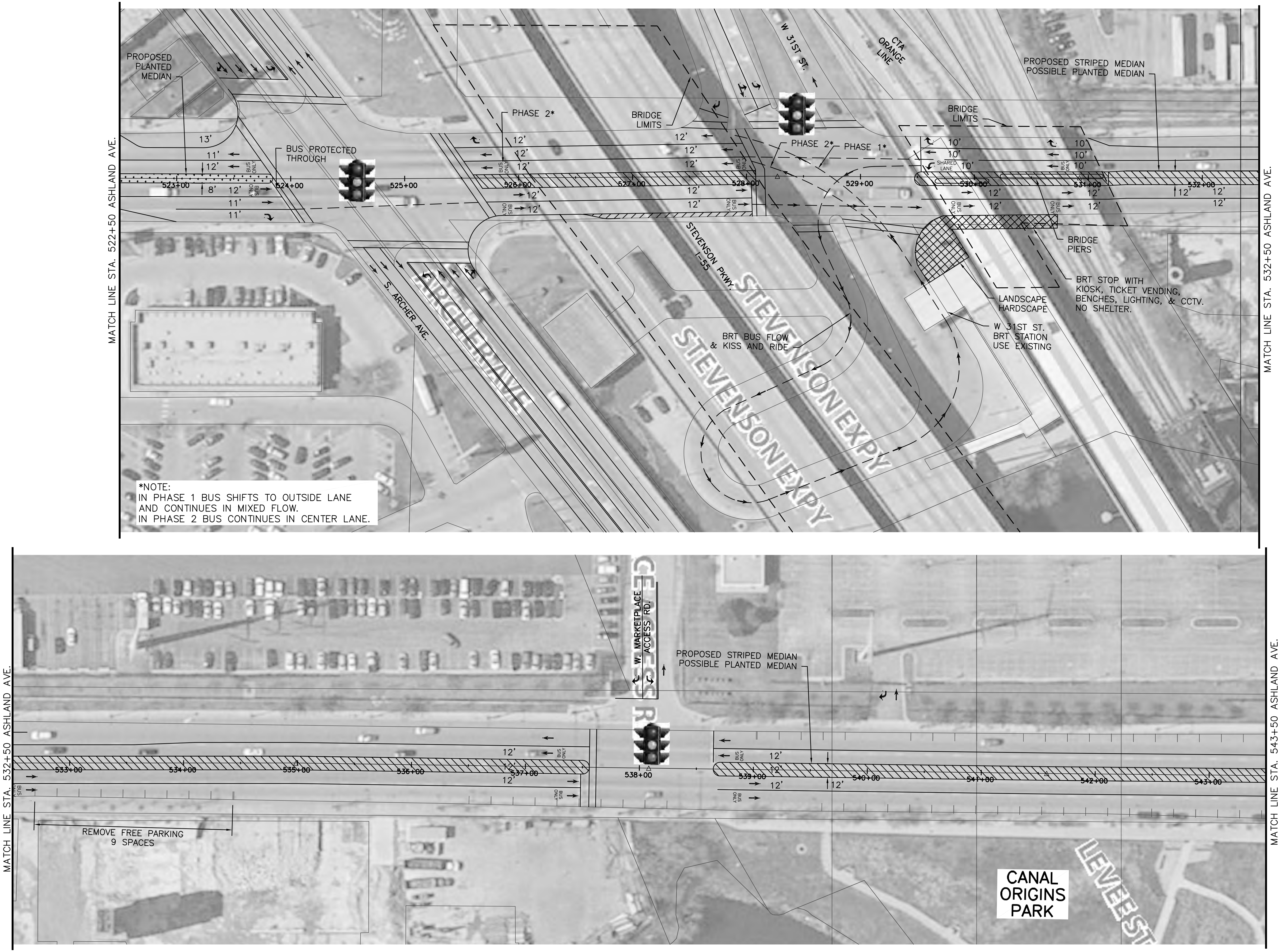
N

0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 505+50 TO STA. 522+50

ASHLAND AVE. BRT

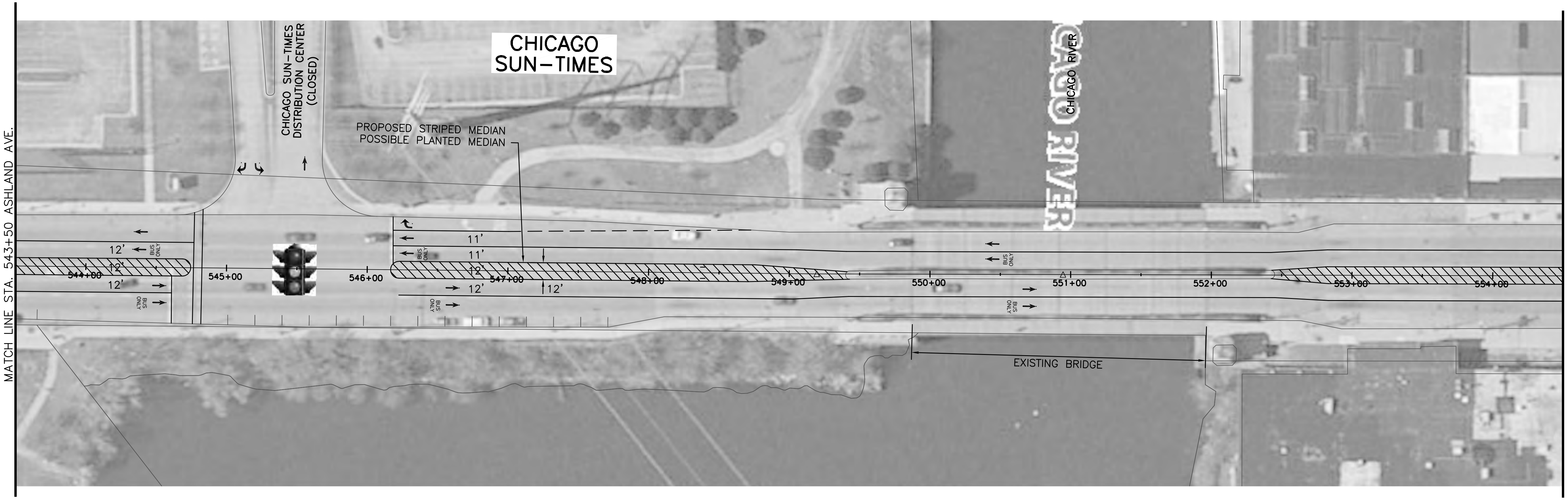


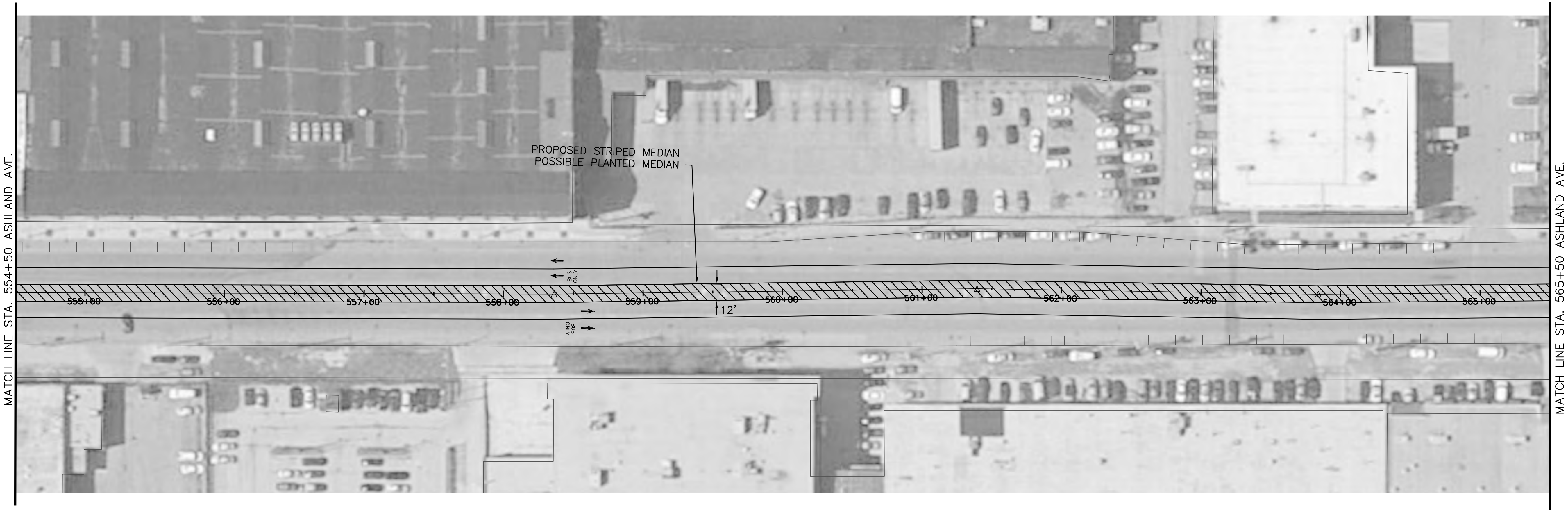
*NOTE:
IN PHASE 1 BUS SHIFTS TO OUTSIDE LANE AND CONTINUES IN MIXED FLOW.
IN PHASE 2 BUS CONTINUES IN CENTER LANE.

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 522+50 TO STA. 543+50

ASHLAND AVE. BRT





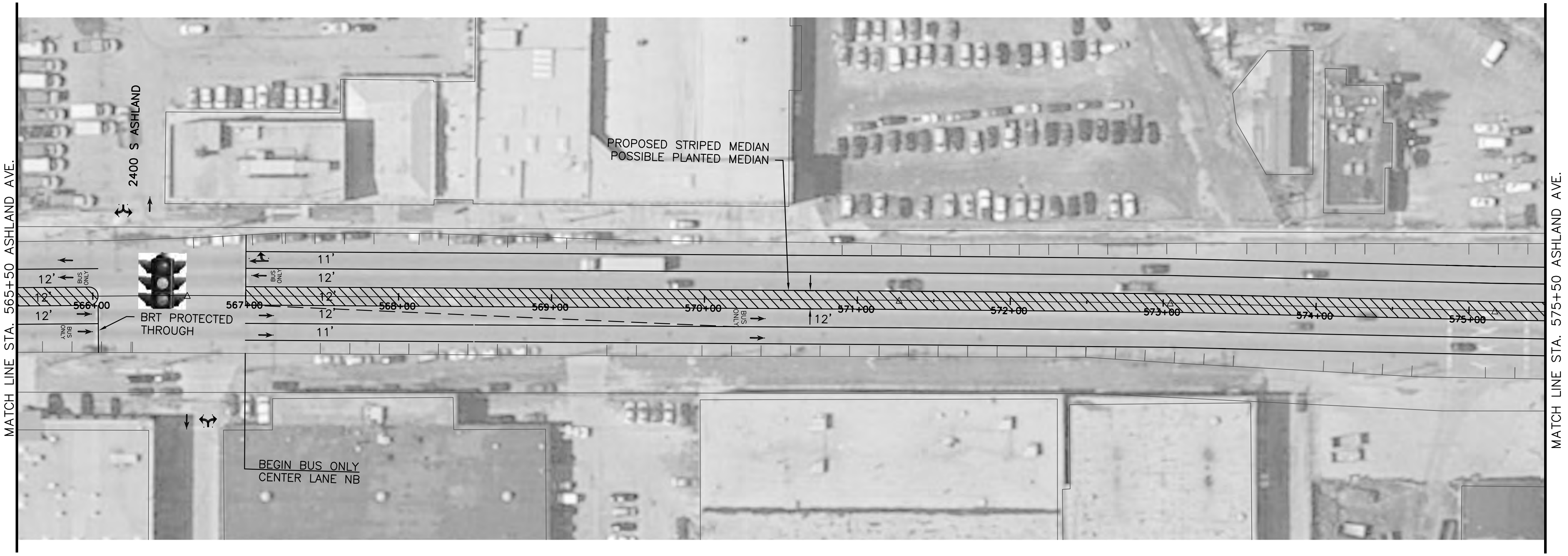
N

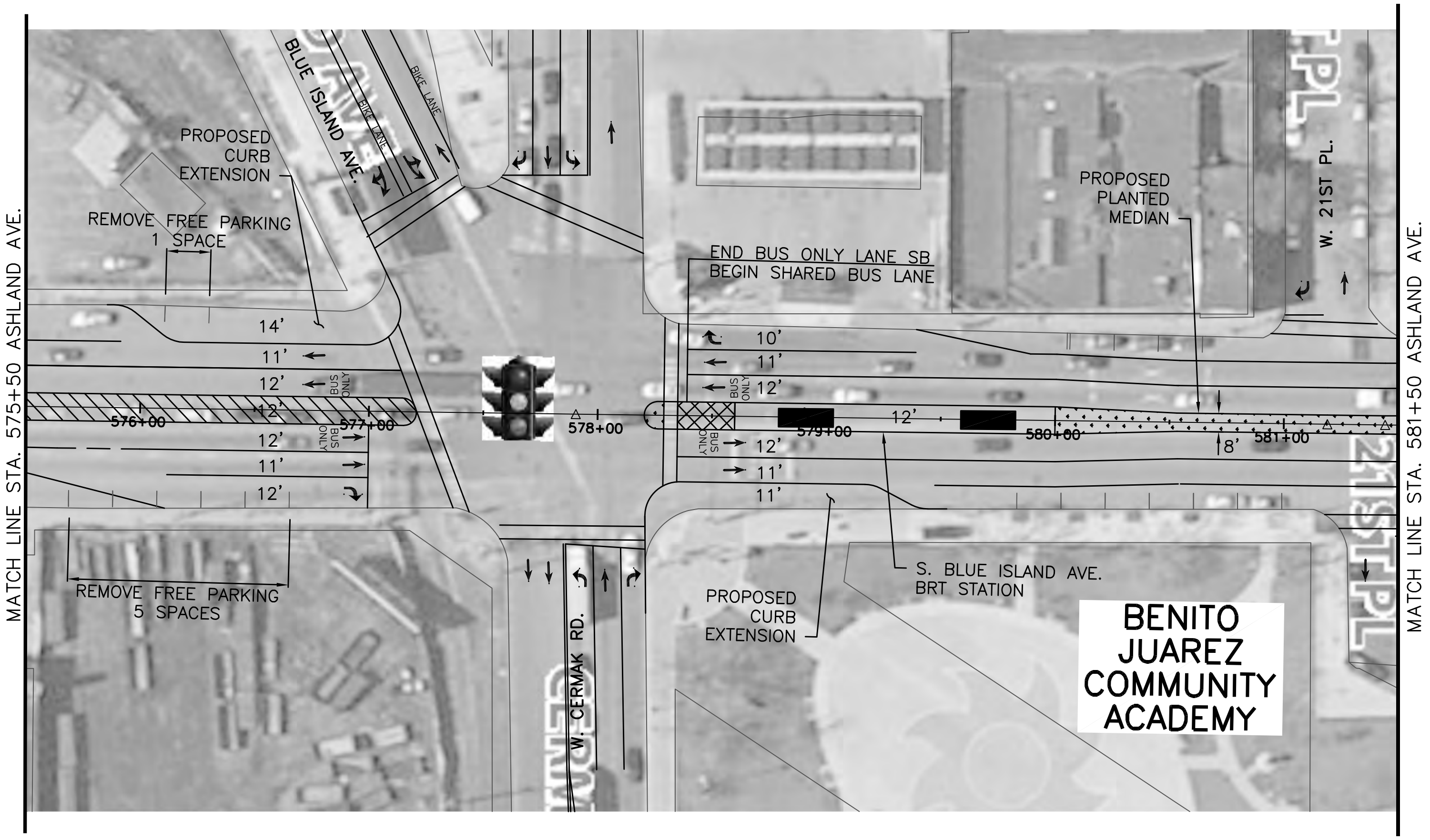
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN - ASHLAND AVENUE
STA. 543+50 TO STA. 565+50

ASHLAND AVE. BRT





N

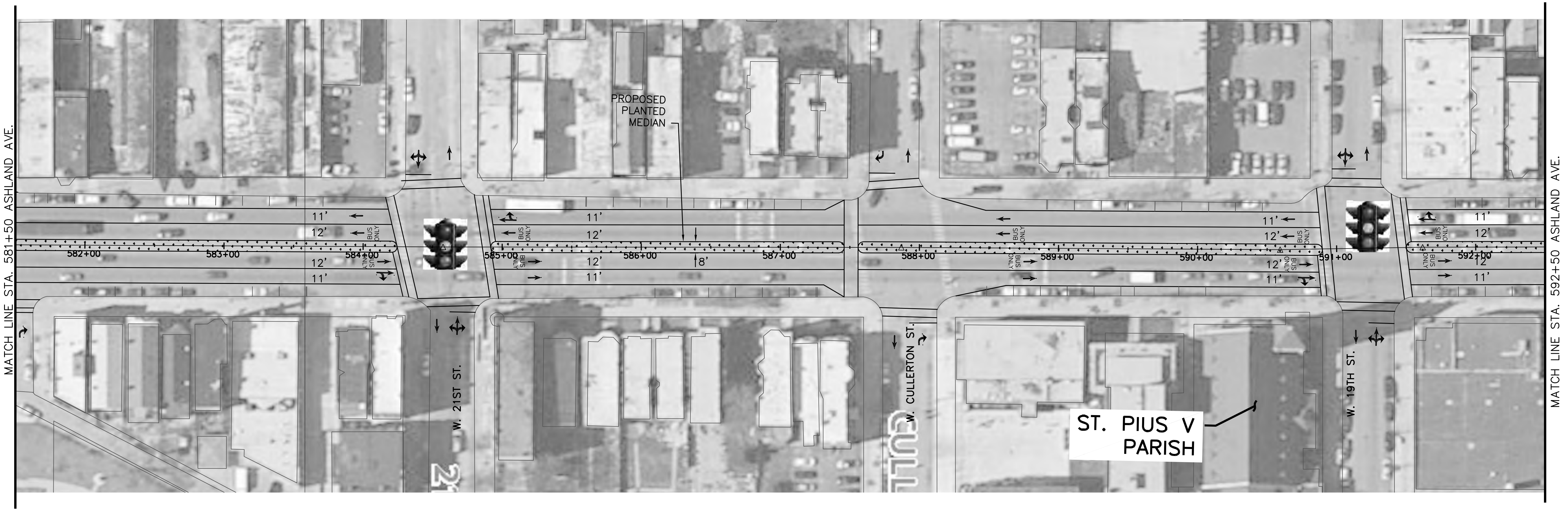
HORIZONTAL SCALE IN FEET
0 40 80

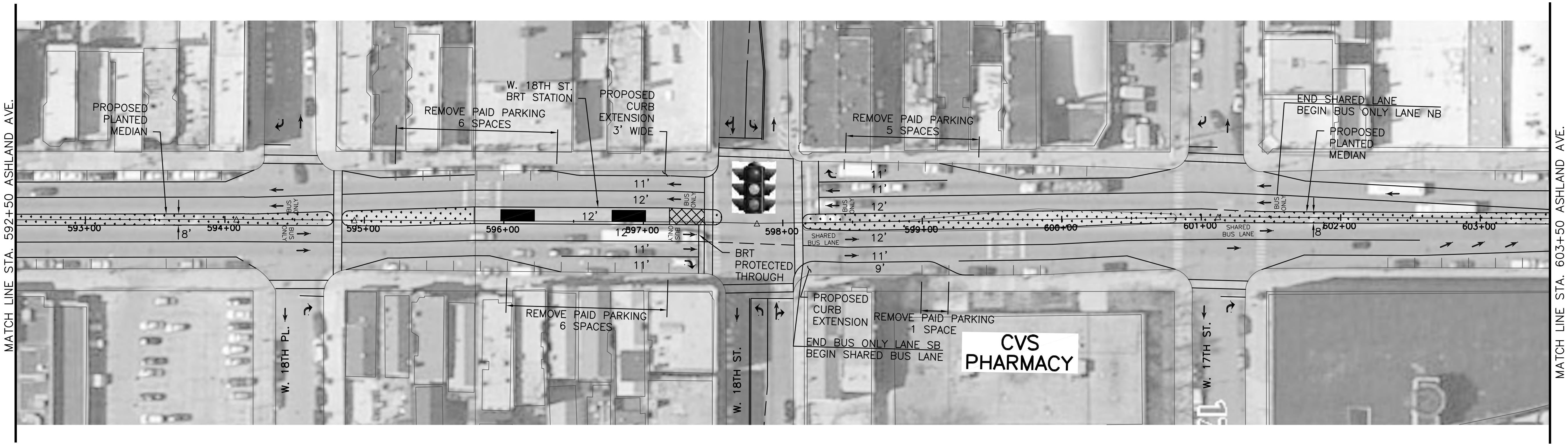
CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 565+50 TO STA. 581+50

ASHLAND AVE. BRT

26
45




MATCH LINE STA. 592+50 ASHLAND AVE.
MATCH LINE STA. 603+50 ASHLAND AVE.
PROPOSED PLANTED MEDIAN
W. 18TH ST. BRT STATION
REMOVE PAID PARKING 6 SPACES
PROPOSED CURB EXTENSION 3' WIDE
REMOVE PAID PARKING 5 SPACES
END SHARED LANE BEGIN BUS ONLY LANE NB
PROPOSED PLANTED MEDIAN
593+00
594+00
595+00
596+00
597+00
598+00
599+00
600+00
601+00
602+00
603+00
11'
12'
8'
9'
BUS ONLY
SHARED BUS LANE
BRT PROTECTED THROUGH
REMOVE PAID PARKING 6 SPACES
PROPOSED CURB EXTENSION
REMOVE PAID PARKING 1 SPACE
END BUS ONLY LANE SB BEGIN SHARED BUS LANE
CVS PHARMACY
W. 18TH PL.
W. 18TH ST.
W. 17TH ST.

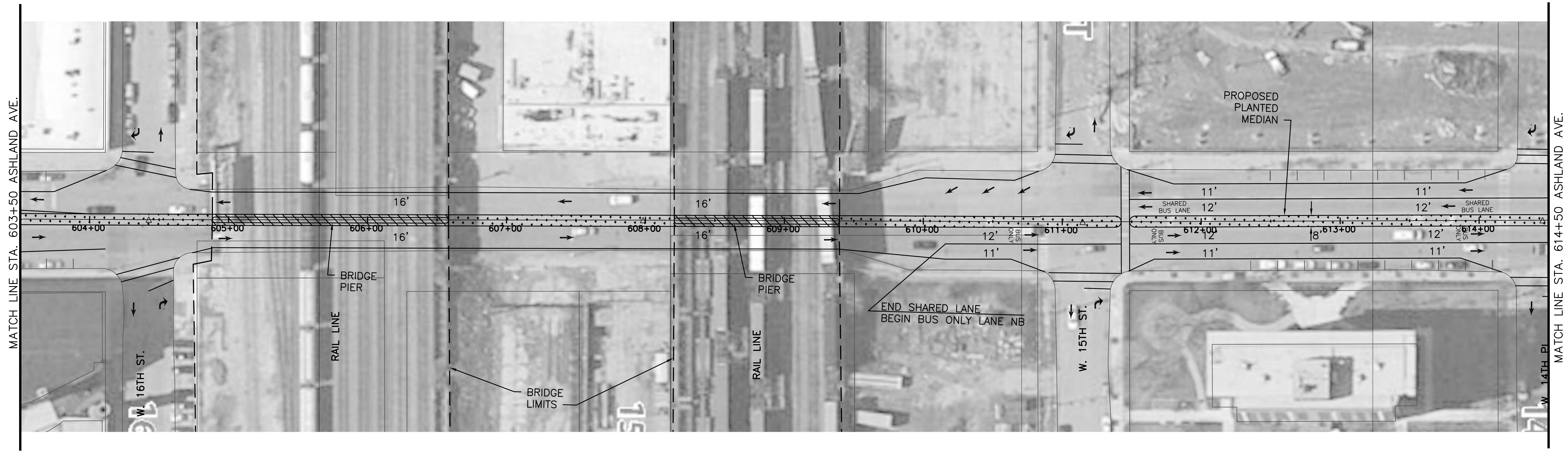
0 40 80
HORIZONTAL SCALE IN FEET

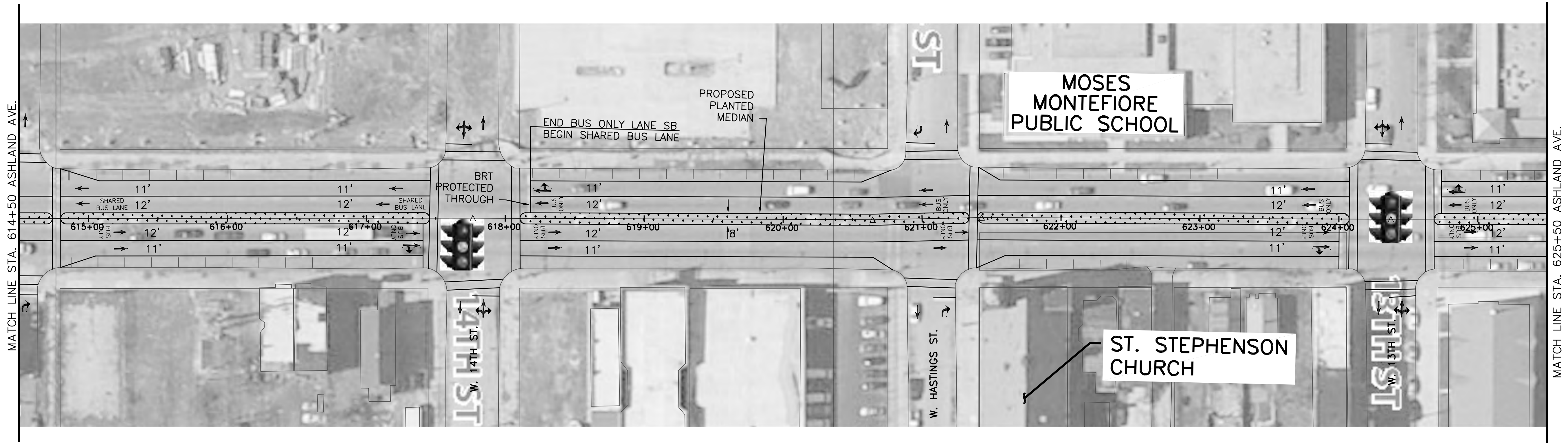
CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 581+50 TO STA. 603+50

ASHLAND AVE. BRT

27
45

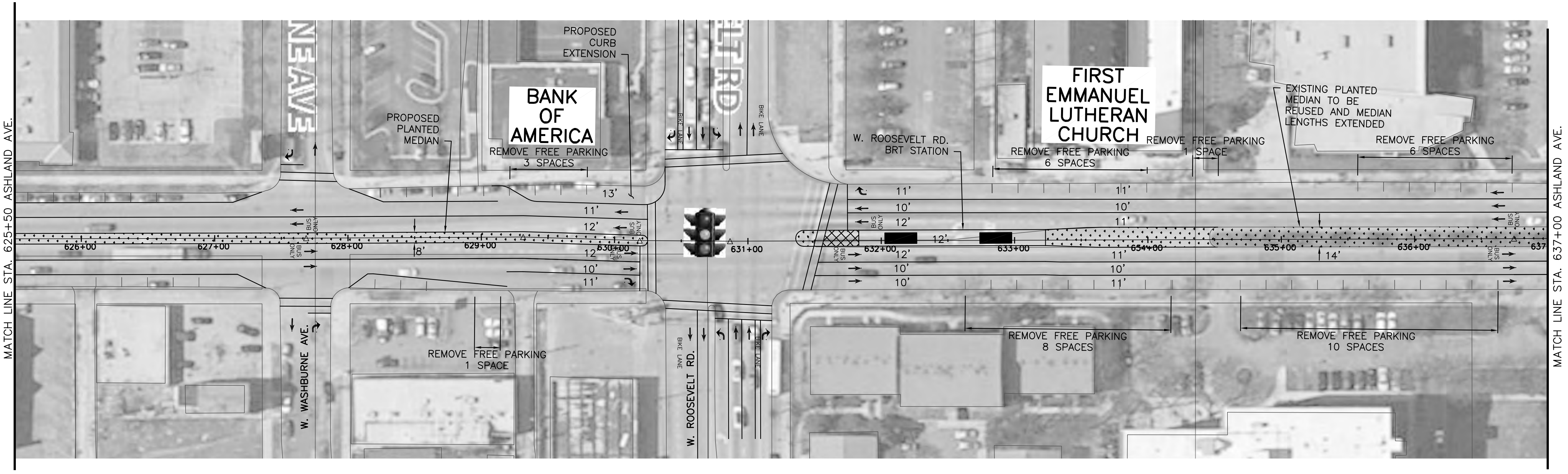


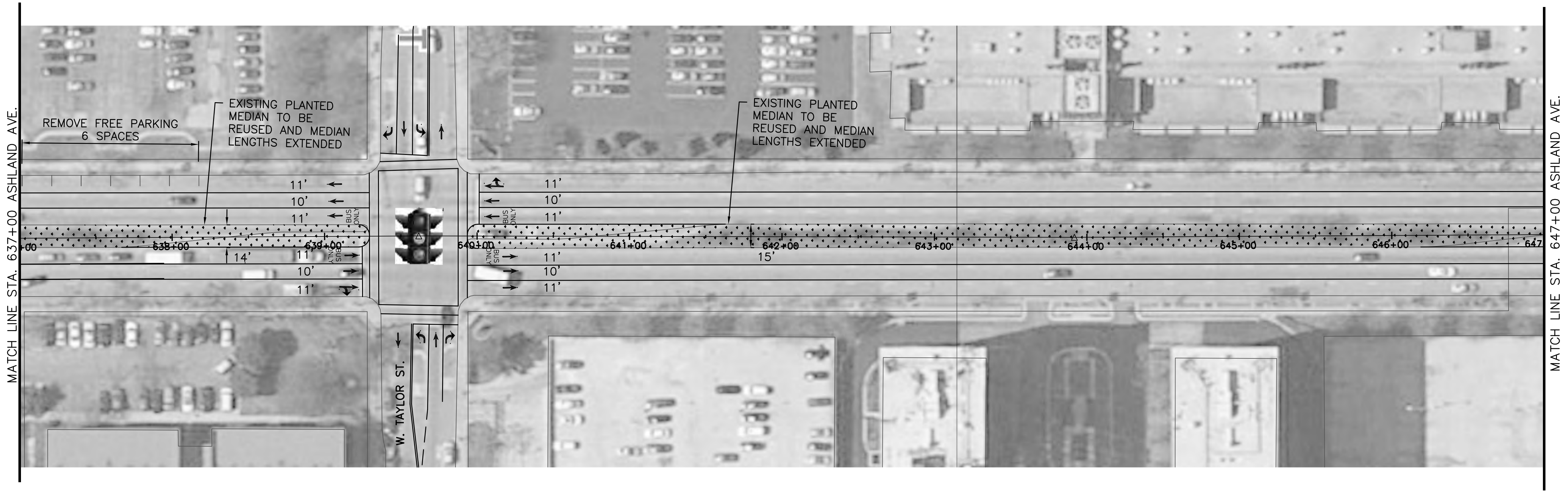


CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 603+50 TO STA. 625+50

ASHLAND AVE. BRT


MATCH LINE STA. 625+50 ASHLAND AVE.
MATCH LINE STA. 637+00 ASHLAND AVE.
BANK OF AMERICA
FIRST EMMANUEL LUTHERAN CHURCH
PROPOSED CURB EXTENSION
PROPOSED PLANTED MEDIAN
REMOVE FREE PARKING 3 SPACES
W. ROOSEVELT RD. BRT STATION
REMOVE FREE PARKING 6 SPACES
REMOVE FREE PARKING 1 SPACE
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
REMOVE FREE PARKING 6 SPACES
REMOVE FREE PARKING 1 SPACE
REMOVE FREE PARKING 8 SPACES
REMOVE FREE PARKING 10 SPACES
W. WASHBURNE AVE.
W. ROOSEVELT RD.
BIKE LANE
BUS ONLY
626+00
627+00
628+00
629+00
630+00
631+00
632+00
633+00
634+00
635+00
636+00
637
13'
11'
12'
8'
12'
10'
11'
11'
10'
11'
12'
12'
11'
10'
10'
14'


MATCH LINE STA. 637+00 ASHLAND AVE.
MATCH LINE STA. 647+00 ASHLAND AVE.
REMOVE FREE PARKING 6 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. TAYLOR ST.
BUS ONLY
+00
638+00
639+00
640+00
641+00
642+00
643+00
644+00
645+00
646+00
647
11'
10'
11'
14'
11'
10'
11'
15'

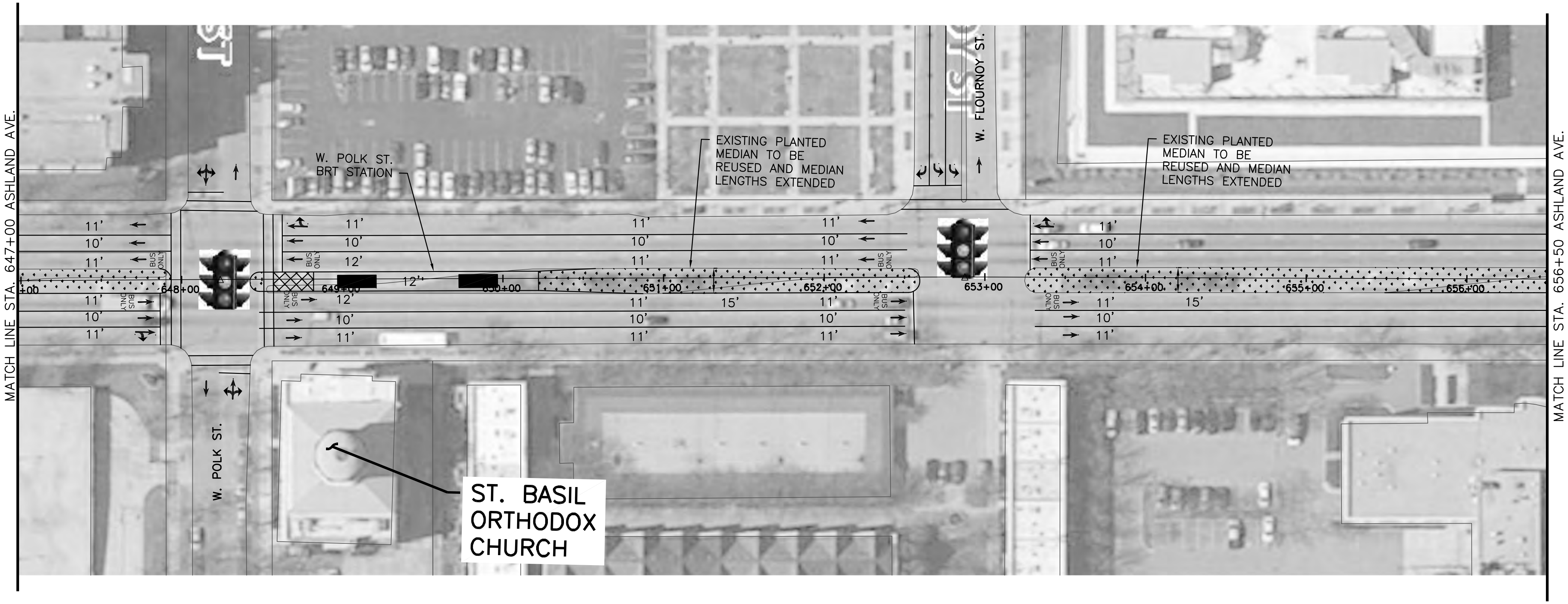
N

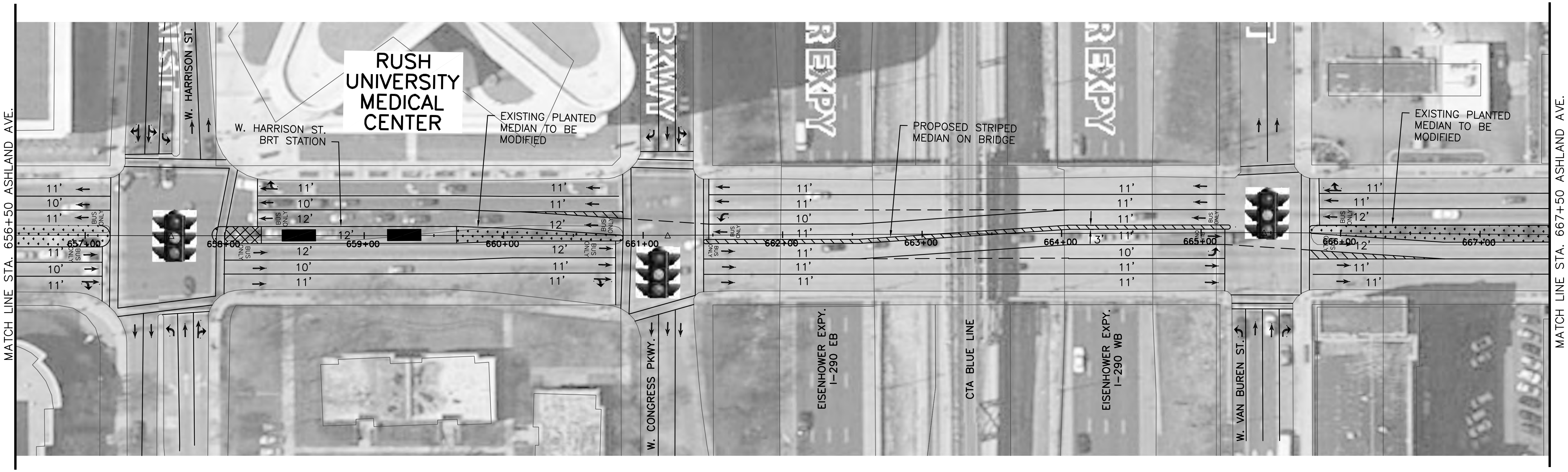
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 625+50 TO STA. 647+00

ASHLAND AVE. BRT


MATCH LINE STA. 647+00 ASHLAND AVE.
W. POLK ST. BRT STATION
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. FLOURNOY ST.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
MATCH LINE STA. 656+50 ASHLAND AVE.
W. POLK ST.
ST. BASIL ORTHODOX CHURCH
648+00
649+00
650+00
651+00
652+00
653+00
654+00
655+00
656+00
11'
10'
12'
15'
BUS ONLY


MATCH LINE STA. 656+50 ASHLAND AVE.
W. HARRISON ST.
RUSH UNIVERSITY MEDICAL CENTER
W. HARRISON ST. BRT STATION
EXISTING PLANTED MEDIAN TO BE MODIFIED
PROPOSED STRIPED MEDIAN ON BRIDGE
EXISTING PLANTED MEDIAN TO BE MODIFIED
MATCH LINE STA. 667+50 ASHLAND AVE.
W. CONGRESS PKWY.
EISENHOWER EXPY. I-290 EB
CTA BLUE LINE
EISENHOWER EXPY. I-290 WB
W. VAN BUREN ST.
657+00
658+00
659+00
660+00
661+00
662+00
663+00
664+00
665+00
666+00
667+00
11'
10'
12'
3'
BUS ONLY

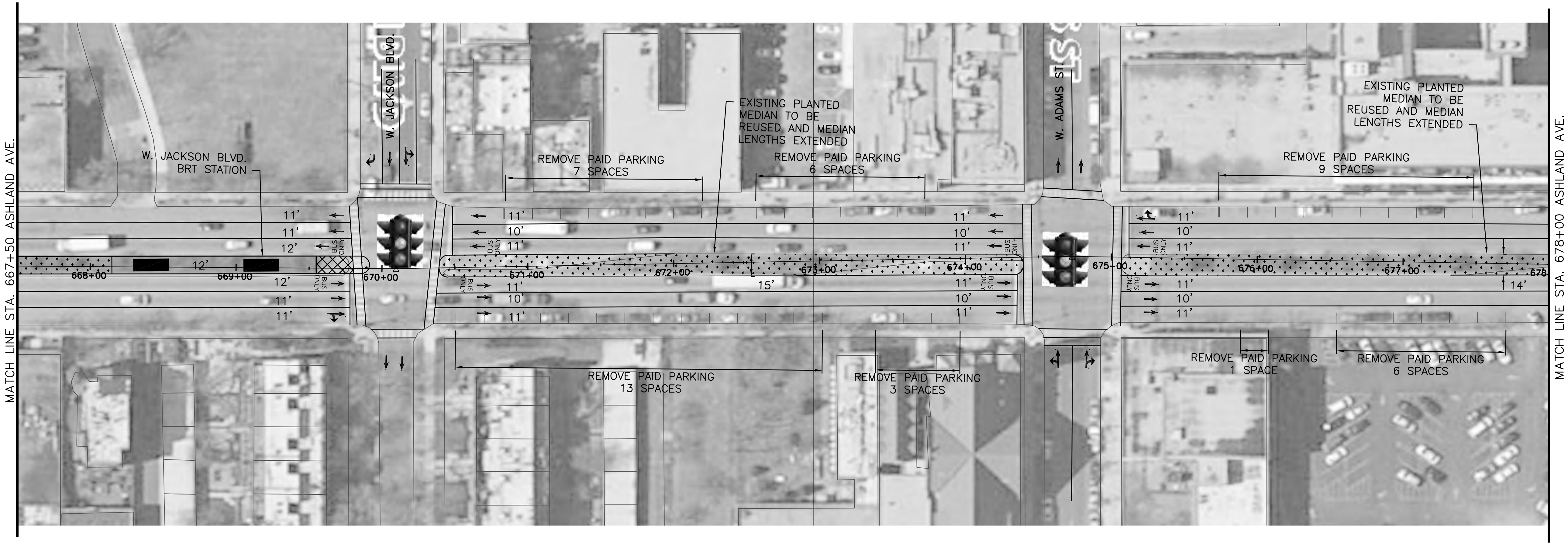
N

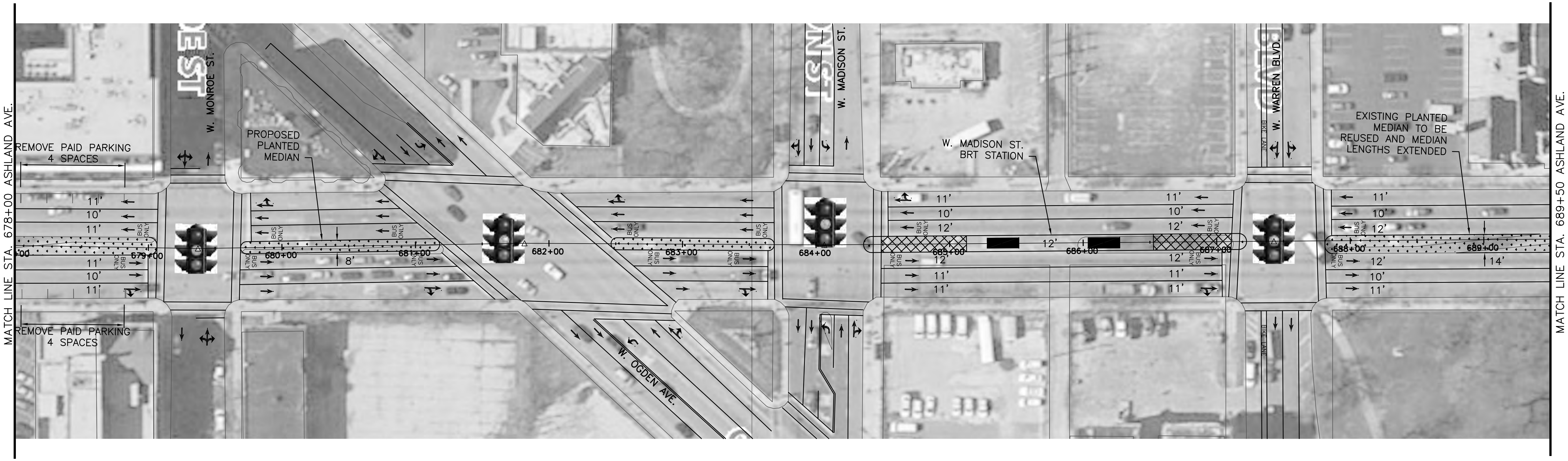
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 647+00 TO STA. 667+50

ASHLAND AVE. BRT


MATCH LINE STA. 667+50 ASHLAND AVE.
W. JACKSON BLVD. BRT STATION
W. JACKSON BLVD.
REMOVE PAID PARKING 7 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
REMOVE PAID PARKING 6 SPACES
W. ADAMS ST.
REMOVE PAID PARKING 9 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
11'
11'
12'
12'
12'
11'
11'
10'
11'
15'
11'
10'
11'
BUS ONLY
668+00
669+00
670+00
671+00
672+00
673+00
674+00
675+00
676+00
677+00
678
14'
REMOVE PAID PARKING 13 SPACES
REMOVE PAID PARKING 3 SPACES
REMOVE PAID PARKING 1 SPACE
REMOVE PAID PARKING 6 SPACES
MATCH LINE STA. 678+00 ASHLAND AVE.

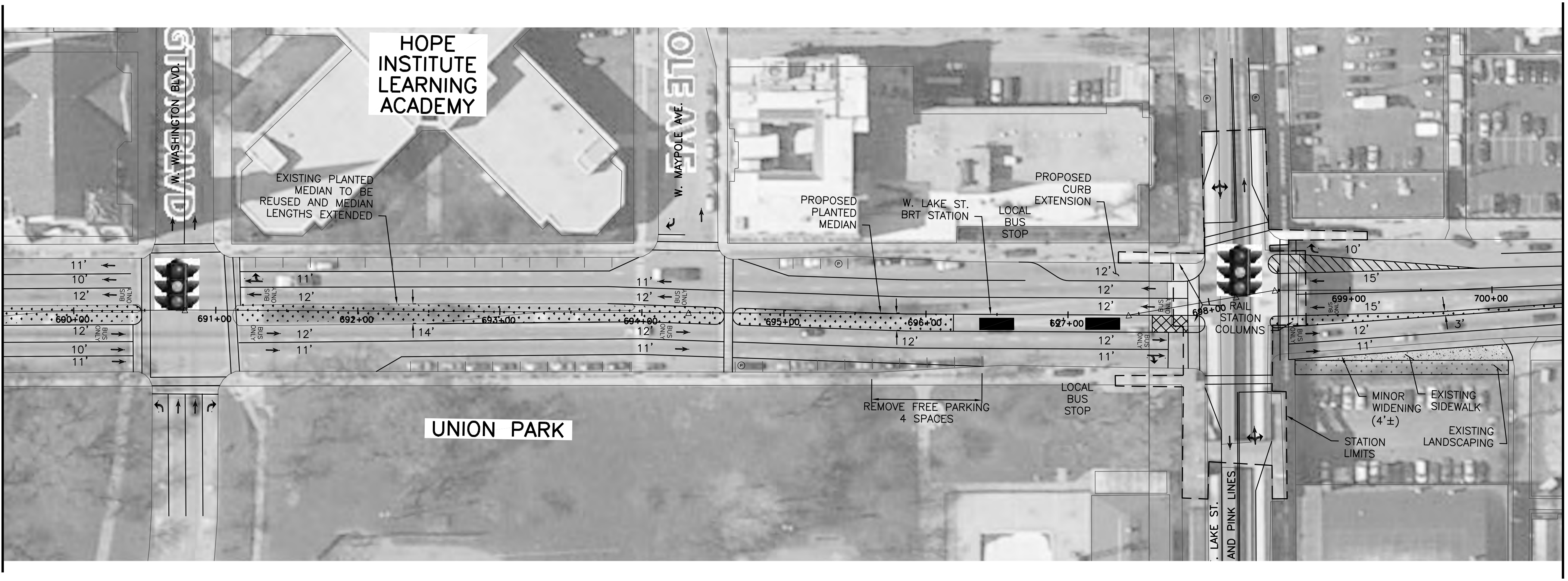

MATCH LINE STA. 678+00 ASHLAND AVE.
REMOVE PAID PARKING 4 SPACES
W. MONROE ST.
PROPOSED PLANTED MEDIAN
W. MADISON ST.
W. MADISON ST. BRT STATION
W. WARREN BLVD.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
11'
10'
11'
12'
8'
BUS ONLY
679+00
680+00
681+00
682+00
683+00
684+00
685+00
686+00
687+00
688+00
689+00
14'
REMOVE PAID PARKING 4 SPACES
W. OGDEN AVE.
BIKE LANE
MATCH LINE STA. 689+50 ASHLAND AVE.

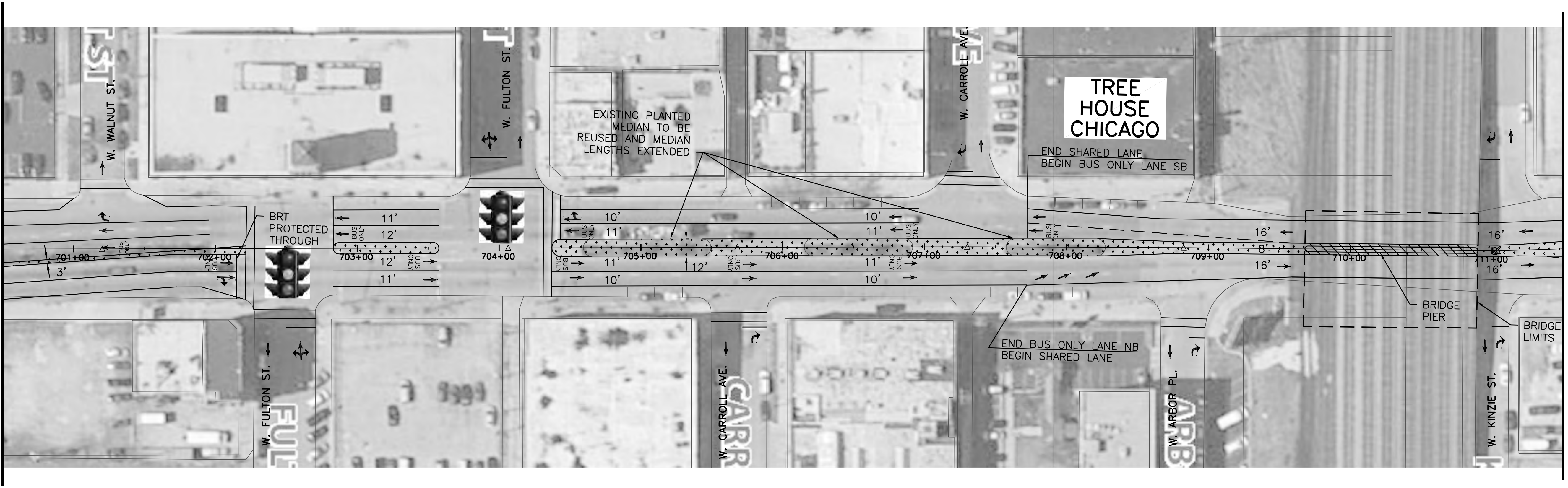
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 667+50 TO STA. 689+50

ASHLAND AVE. BRT





N

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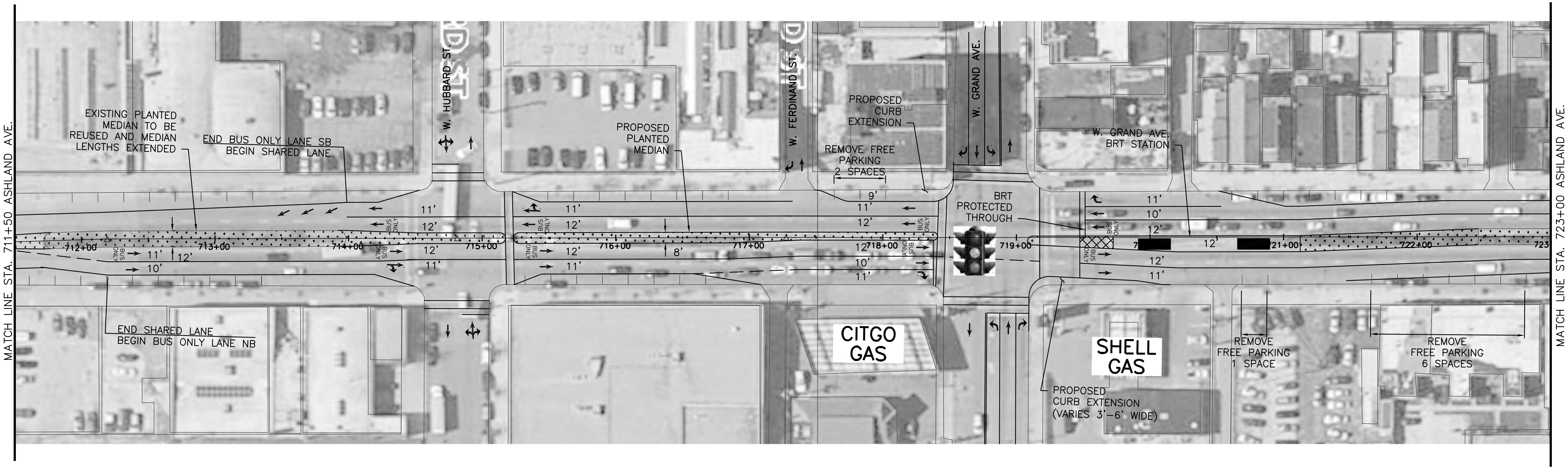
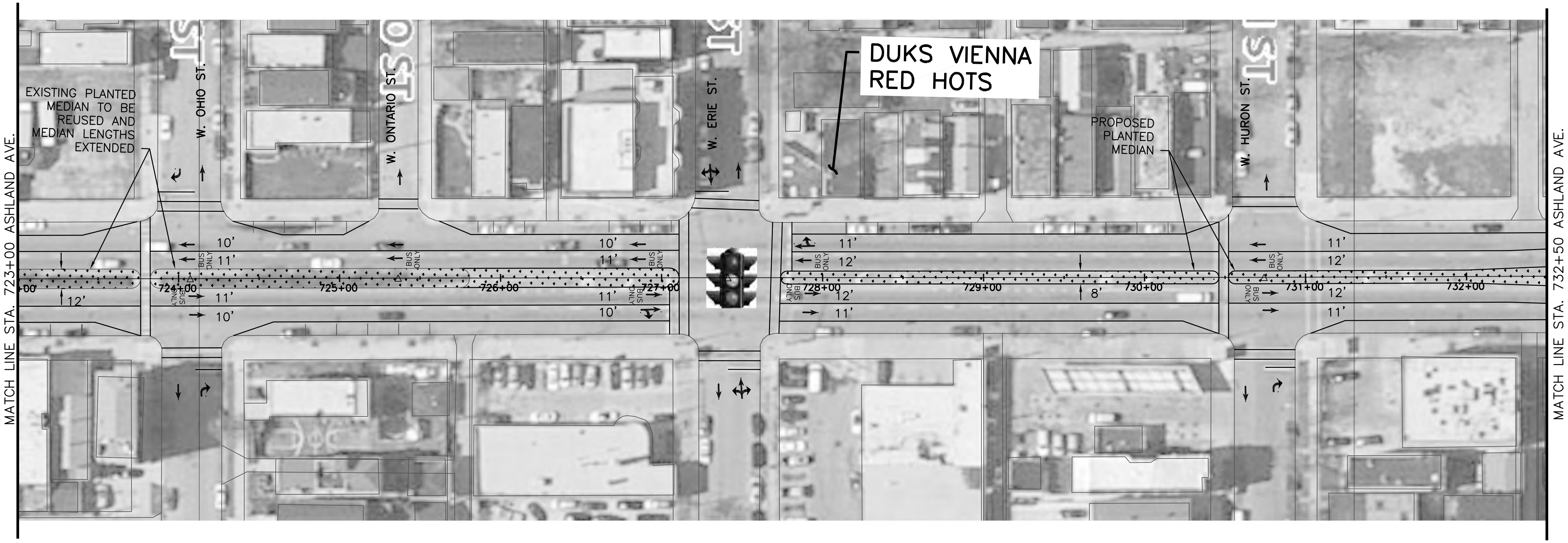
40
80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 689+50 TO STA. 711+50

ASHLAND AVE. BRT


MATCH LINE STA. 711+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
END BUS ONLY LANE SB BEGIN SHARED LANE
W. HUBBARD ST.
PROPOSED PLANTED MEDIAN
W. FERDINAND ST.
PROPOSED CURB EXTENSION
REMOVE FREE PARKING 2 SPACES
W. GRAND AVE.
BRT PROTECTED THROUGH
W. GRAND AVE. BRT STATION
END SHARED LANE BEGIN BUS ONLY LANE NB
CITGO GAS
SHELL GAS
PROPOSED CURB EXTENSION (VARIES 3'-6' WIDE)
REMOVE FREE PARKING 1 SPACE
REMOVE FREE PARKING 6 SPACES
712+00
713+00
714+00
715+00
716+00
717+00
718+00
719+00
721+00
722+00
BUS ONLY
11'
12'
10'
9'
8'
MATCH LINE STA. 723+00 ASHLAND AVE.



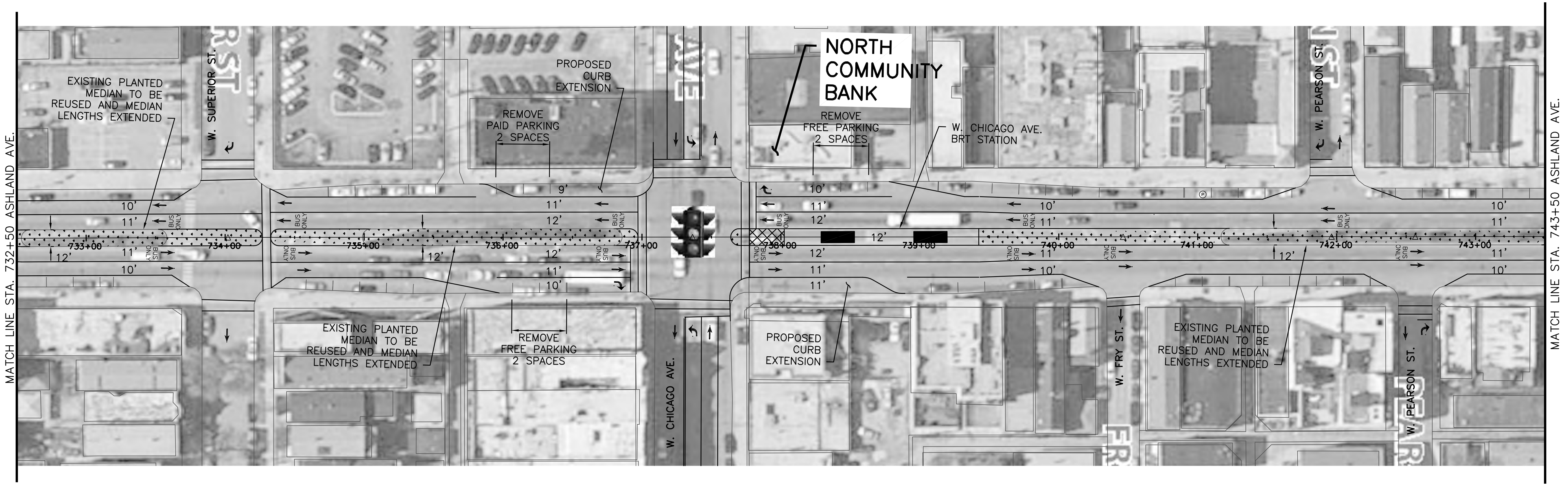
N

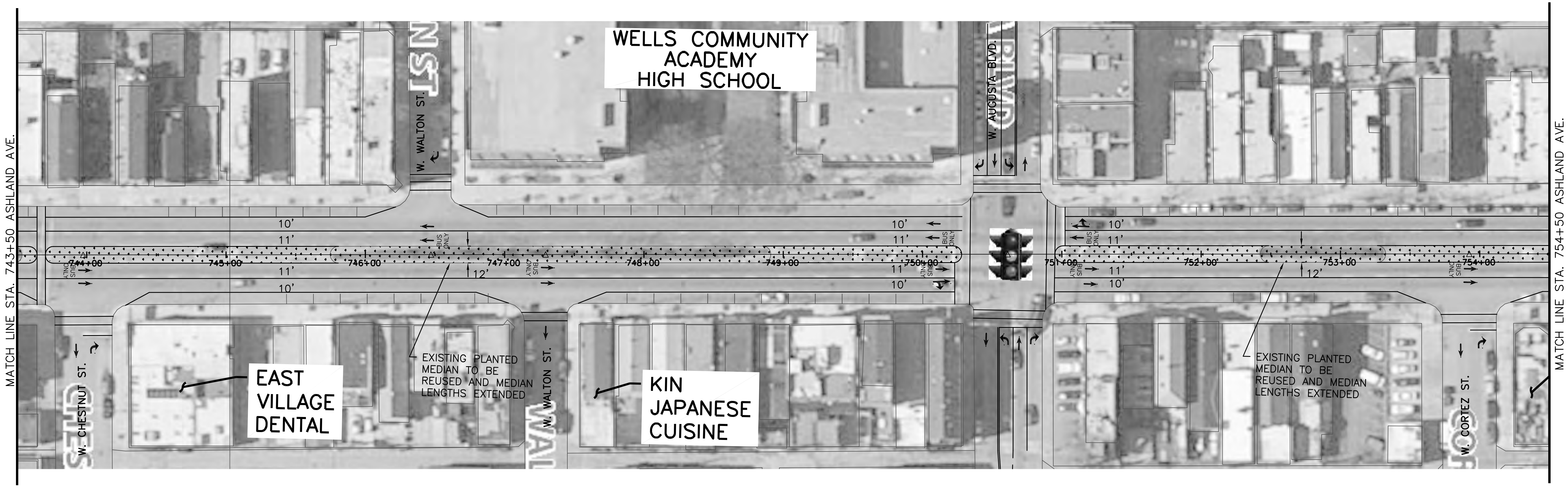
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 711+50 TO STA. 732+50

ASHLAND AVE. BRT


MATCH LINE STA. 732+50 ASHLAND AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. SUPERIOR ST.
PROPOSED CURB EXTENSION
REMOVE PAID PARKING 2 SPACES
NORTH COMMUNITY BANK
REMOVE FREE PARKING 2 SPACES
W. CHICAGO AVE. BRT STATION
W. PEARSON ST.
MATCH LINE STA. 743+50 ASHLAND AVE.
10'
11'
12'
9'
BUS ONLY
733+00
734+00
735+00
736+00
737+00
738+00
739+00
740+00
741+00
742+00
743+00
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
REMOVE FREE PARKING 2 SPACES
W. CHICAGO AVE.
PROPOSED CURB EXTENSION
W. FRY ST.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. PEARSON ST.


WELLS COMMUNITY ACADEMY HIGH SCHOOL
W. WALTON ST.
W. AUGUSTA BLVD.
MATCH LINE STA. 743+50 ASHLAND AVE.
MATCH LINE STA. 754+50 ASHLAND AVE.
10'
11'
12'
BUS ONLY
744+00
745+00
746+00
747+00
748+00
749+00
750+00
751+00
752+00
753+00
754+00
W. CHESTNUT ST.
EAST VILLAGE DENTAL
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. WALTON ST.
KIN JAPANESE CUISINE
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. CORTEZ ST.

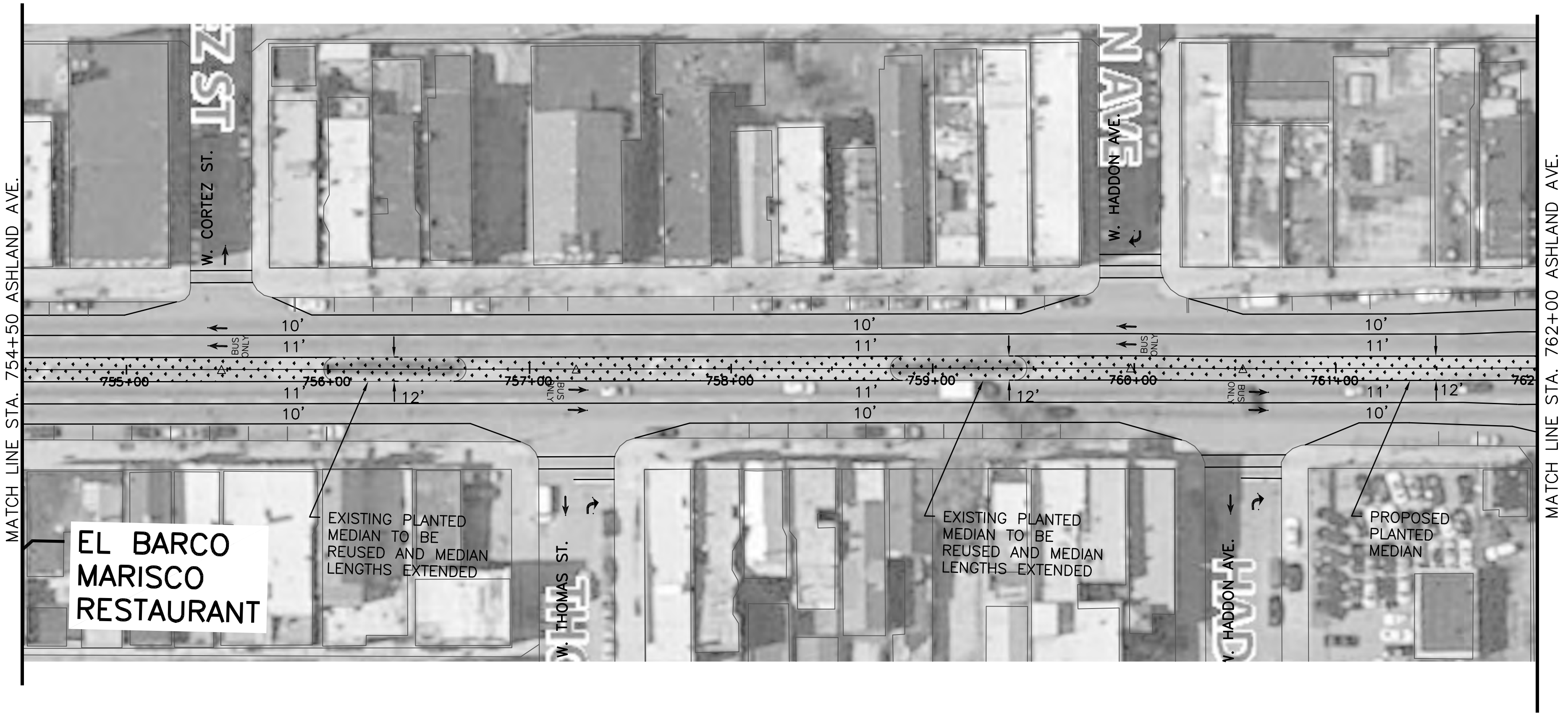
N

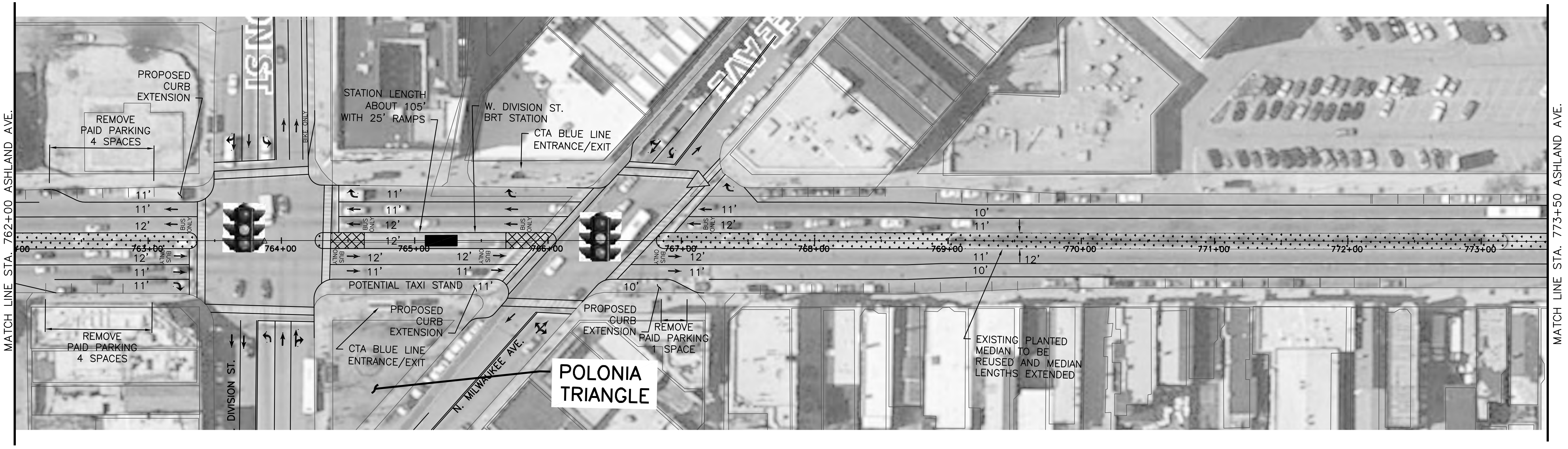
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 732+50 TO STA. 754+50

ASHLAND AVE. BRT


MATCH LINE STA. 754+50 ASHLAND AVE.
MATCH LINE STA. 762+00 ASHLAND AVE.
W. CORTEZ ST.
W. HADDON AVE.
W. THOMAS ST.
W. HADDON AVE.
10'
11'
12'
BUS ONLY
755+00
756+00
757+00
758+00
759+00
760+00
761+00
762
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED PLANTED MEDIAN
EL BARCO MARISCO RESTAURANT


MATCH LINE STA. 762+00 ASHLAND AVE.
MATCH LINE STA. 773+50 ASHLAND AVE.
PROPOSED CURB EXTENSION
REMOVE PAID PARKING 4 SPACES
STATION LENGTH ABOUT 105' WITH 25' RAMPS
W. DIVISION ST. BRT STATION
CTA BLUE LINE ENTRANCE/EXIT
BIKE ONLY
11'
12'
10'
BUS ONLY
763+00
764+00
765+00
766+00
767+00
768+00
769+00
770+00
771+00
772+00
773+00
POTENTIAL TAXI STAND
REMOVE PAID PARKING 4 SPACES
DIVISION ST.
PROPOSED CURB EXTENSION
CTA BLUE LINE ENTRANCE/EXIT
N. MILWAUKEE AVE.
POLONIA TRIANGLE
PROPOSED CURB EXTENSION
REMOVE PAID PARKING SPACE
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED

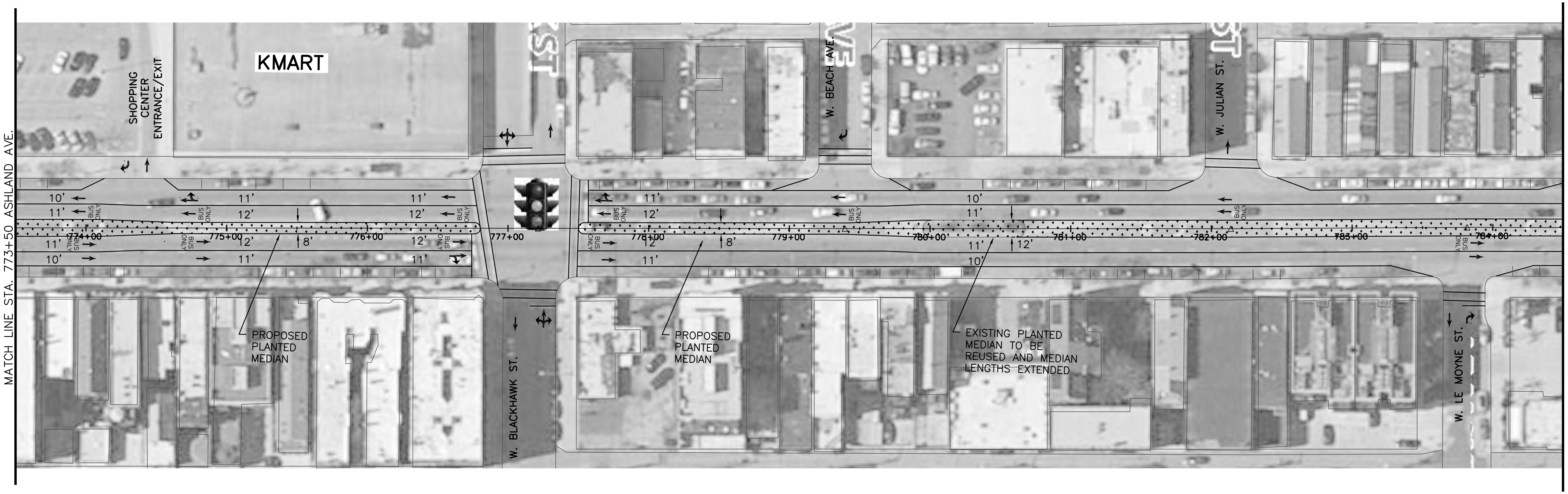
N

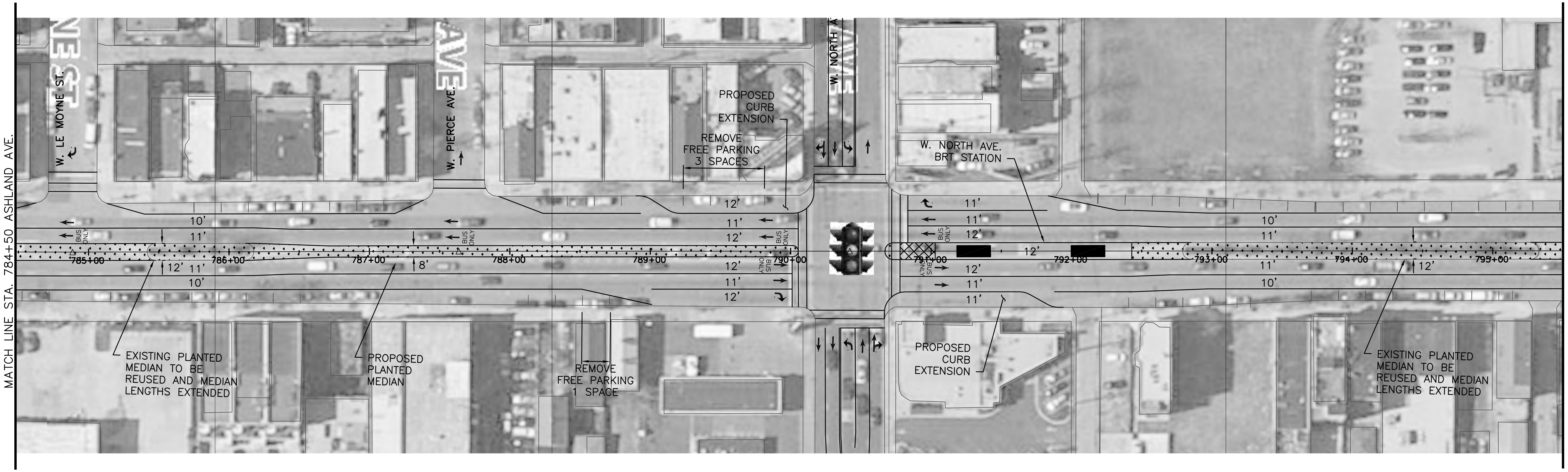
0 40 80
HORIZONTAL SCALE IN FEET

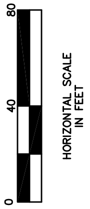
CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 754+50 TO STA. 773+50

ASHLAND AVE. BRT




MATCH LINE STA. 784+50 ASHLAND AVE.
MATCH LINE STA. 795+50 ASHLAND AVE.
W. LE MOYNE ST.
W. PIERCE AVE.
W. NORTH AVE.
BUS ONLY
10'
11'
12'
8'
785+00
786+00
787+00
788+00
789+00
790+00
791+00
792+00
793+00
794+00
795+00
PROPOSED CURB EXTENSION
REMOVE FREE PARKING 3 SPACES
W. NORTH AVE. BRT STATION
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED PLANTED MEDIAN
REMOVE FREE PARKING 1 SPACE
PROPOSED CURB EXTENSION
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED

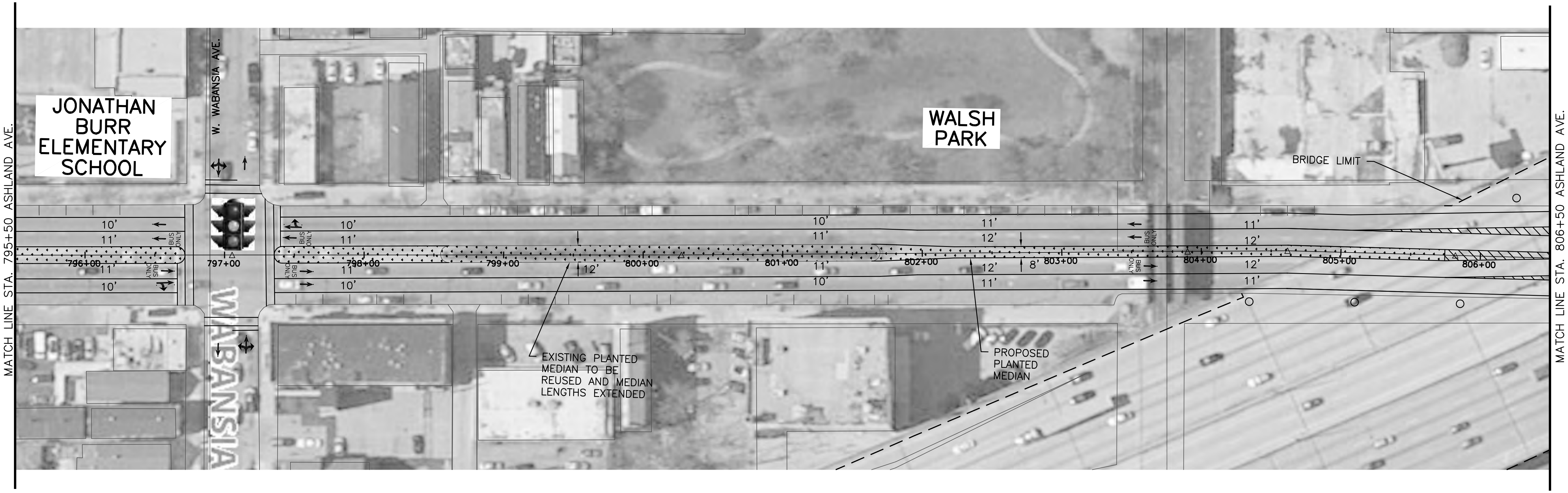


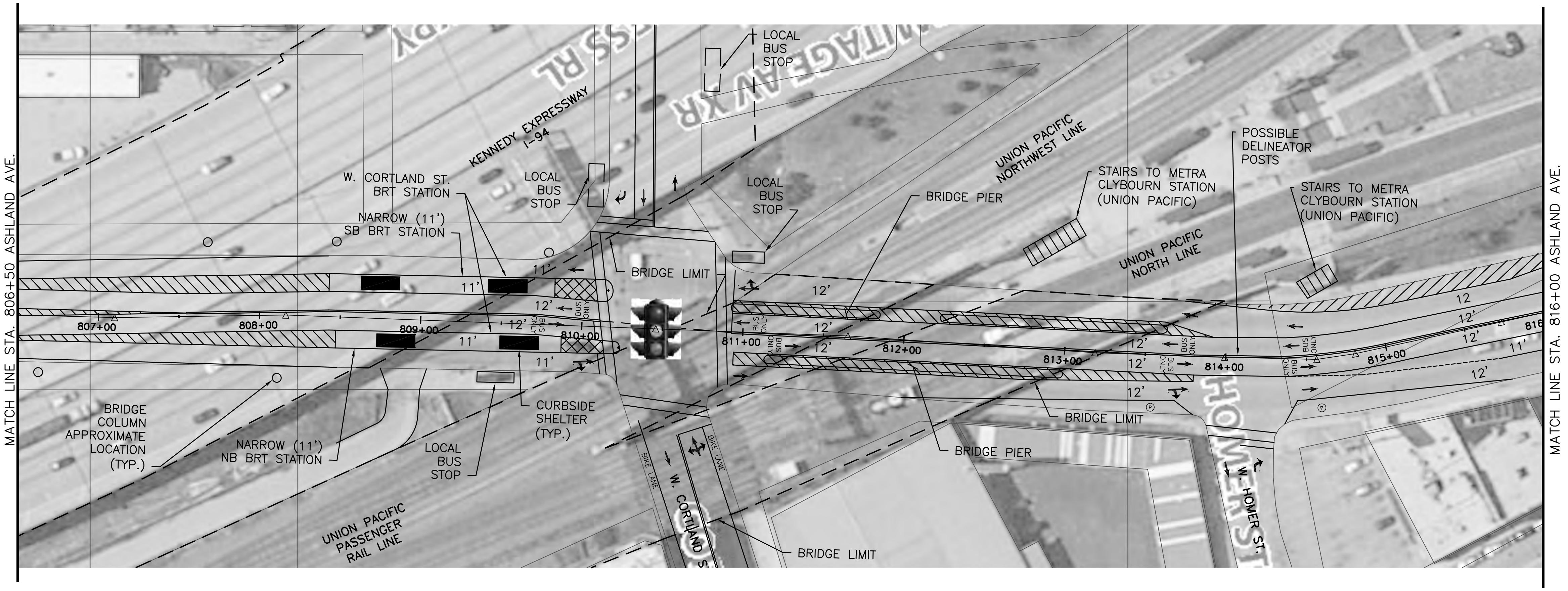
CALCULATED SMS

CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 773+50 TO STA. 795+50

ASHLAND AVE. BRT


MATCH LINE STA. 795+50 ASHLAND AVE.
JONATHAN BURR ELEMENTARY SCHOOL
W. WABANSIA AVE.
WABANSIA
WALSH PARK
BRIDGE LIMIT
10'
11'
12'
8'
BUS ONLY
796+00
797+00
798+00
799+00
800+00
801+00
802+00
803+00
804+00
805+00
806+00
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
PROPOSED PLANTED MEDIAN
MATCH LINE STA. 806+50 ASHLAND AVE.


MATCH LINE STA. 806+50 ASHLAND AVE.
KENNEDY EXPRESSWAY I-94
LOCAL BUS STOP
W. CORTLAND ST. BRT STATION
NARROW (11') SB BRT STATION
BRIDGE LIMIT
UNION PACIFIC NORTHWEST LINE
BRIDGE PIER
STAIRS TO METRA CLYBOURN STATION (UNION PACIFIC)
POSSIBLE DELINEATOR POSTS
UNION PACIFIC NORTH LINE
11'
12'
12
BUS ONLY
807+00
808+00
809+00
810+00
811+00
812+00
813+00
814+00
815+00
816
BRIDGE COLUMN APPROXIMATE LOCATION (TYP.)
NARROW (11') NB BRT STATION
CURBSIDE SHELTER (TYP.)
UNION PACIFIC PASSENGER RAIL LINE
BIKE LANE
W. CORTLAND ST
W. HOMER ST.
HOMER ST
MATCH LINE STA. 816+00 ASHLAND AVE.

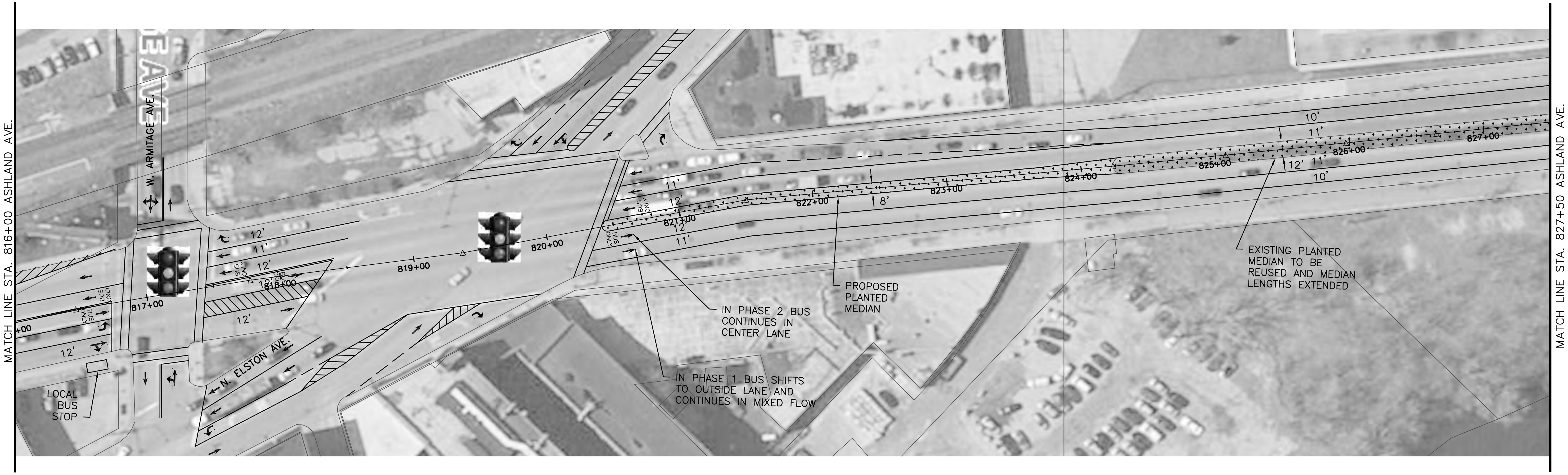
N

0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 795+50 TO STA. 816+00

ASHLAND AVE. BRT

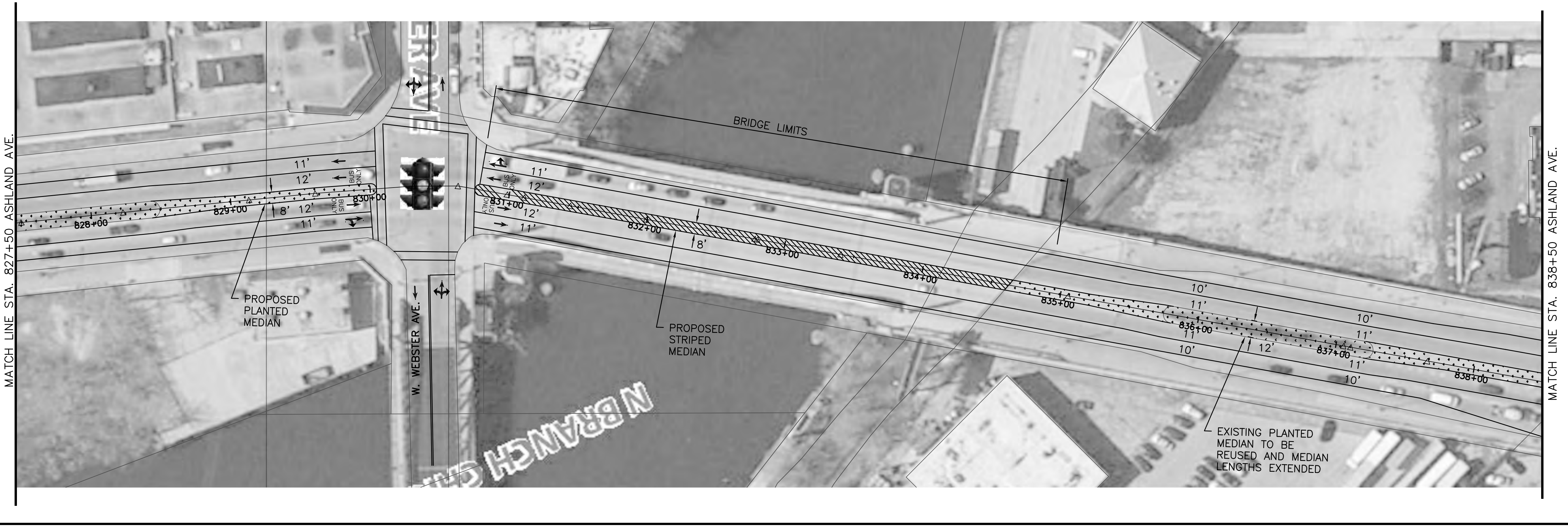


IN PHASE 2 BUS CONTINUES IN CENTER LANE

IN PHASE 1 BUS SHIFTS TO OUTSIDE LANE AND CONTINUES IN MIXED FLOW

PROPOSED PLANTED MEDIAN

EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED



BRIDGE LIMITS

PROPOSED PLANTED MEDIAN

PROPOSED STRIPED MEDIAN

EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED

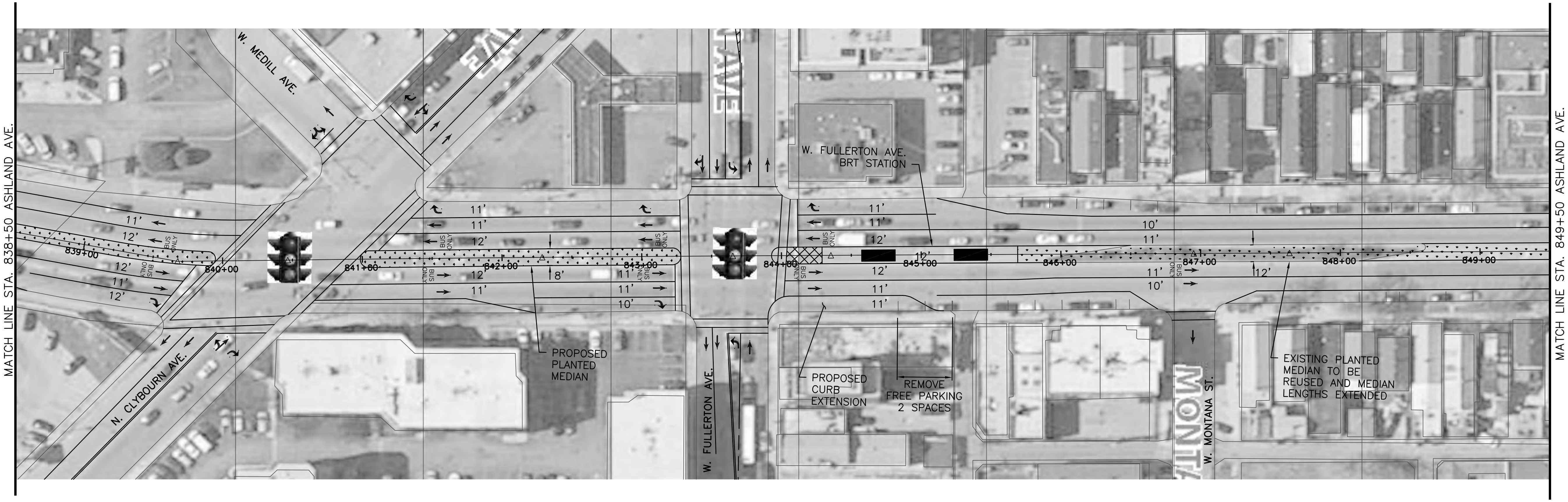
N

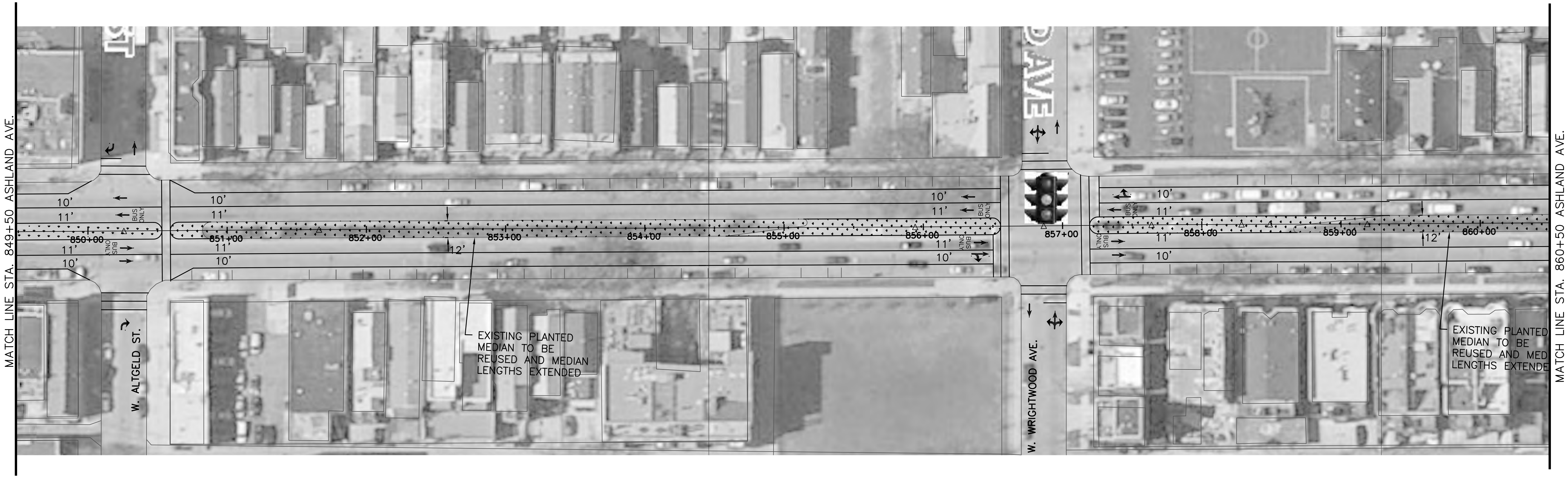
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 816+00 TO STA. 838+50

ASHLAND AVE. BRT





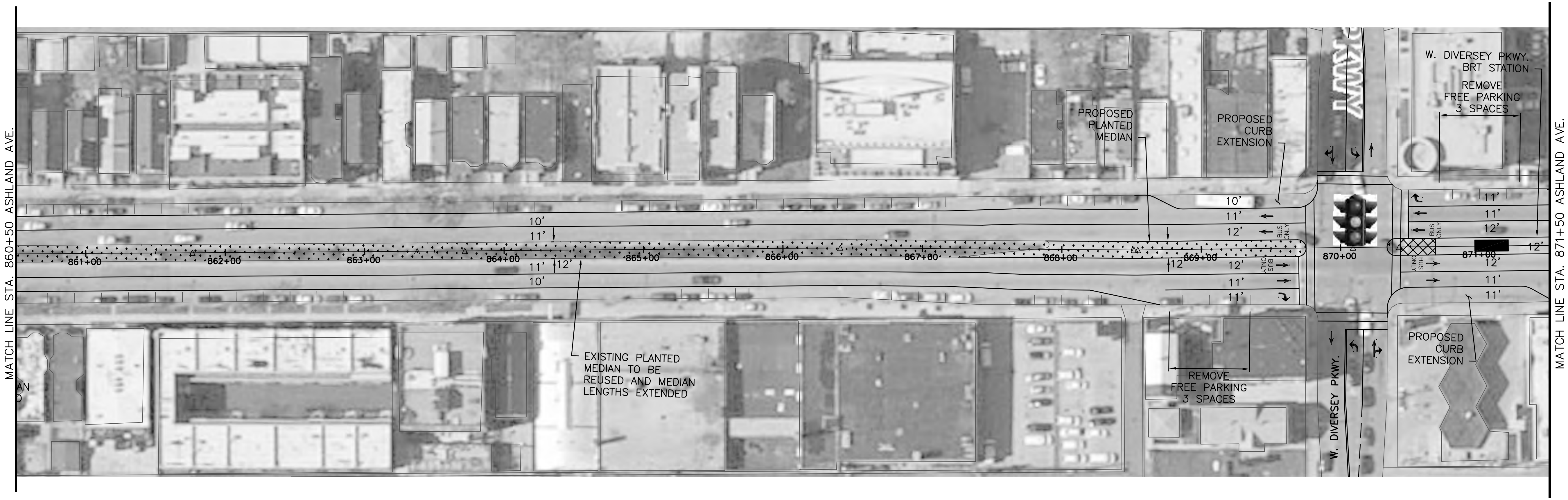
MATCH LINE STA. 849+50 ASHLAND AVE.
W. ALTGELD ST.
W. WRIGHTWOOD AVE.
MATCH LINE STA. 860+50 ASHLAND AVE.
850+00
851+00
852+00
853+00
854+00
855+00
856+00
857+00
858+00
859+00
860+00
10'
11'
12'
BUS ONLY
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED

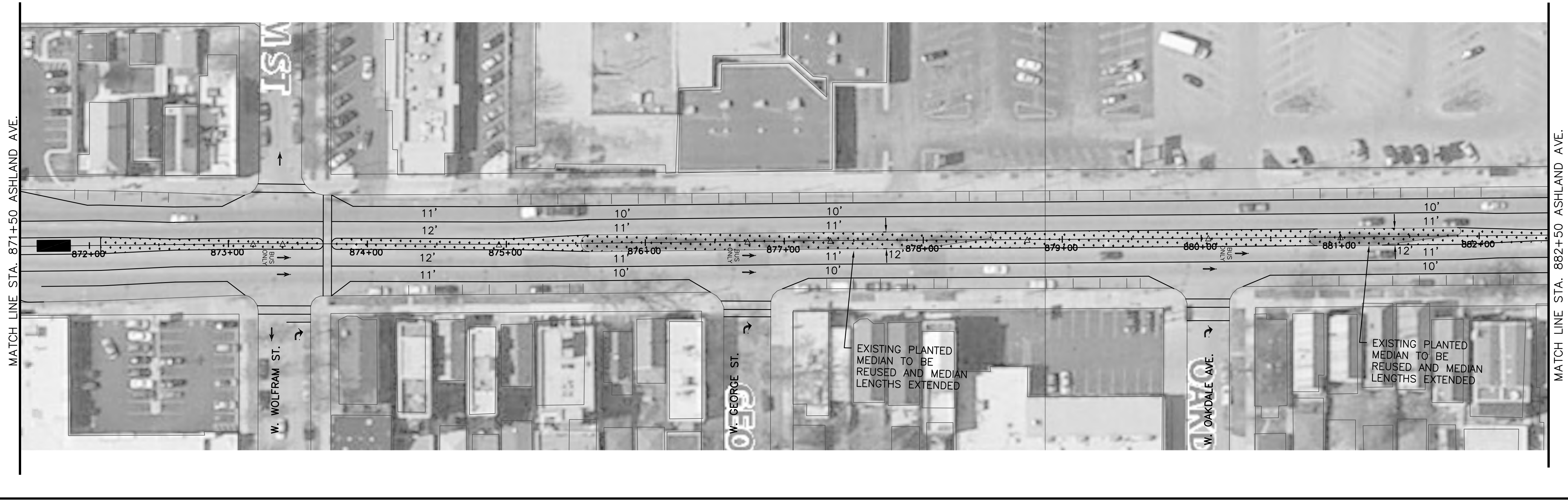
CALCULATED SMS

CHECKED SDG

PLAN - ASHLAND AVENUE
STA. 838+50 TO STA. 860+50

ASHLAND AVE. BRT


MATCH LINE STA. 860+50 ASHLAND AVE.
861+00
862+00
863+00
864+00
865+00
866+00
867+00
868+00
869+00
870+00
871+00
10'
11'
12'
BUS ONLY
PROPOSED PLANTED MEDIAN
PROPOSED CURB EXTENSION
W. DIVERSEY PKWY. BRT STATION
REMOVE FREE PARKING 3 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
REMOVE FREE PARKING 3 SPACES
W. DIVERSEY PKWY.
PROPOSED CURB EXTENSION
MATCH LINE STA. 871+50 ASHLAND AVE.

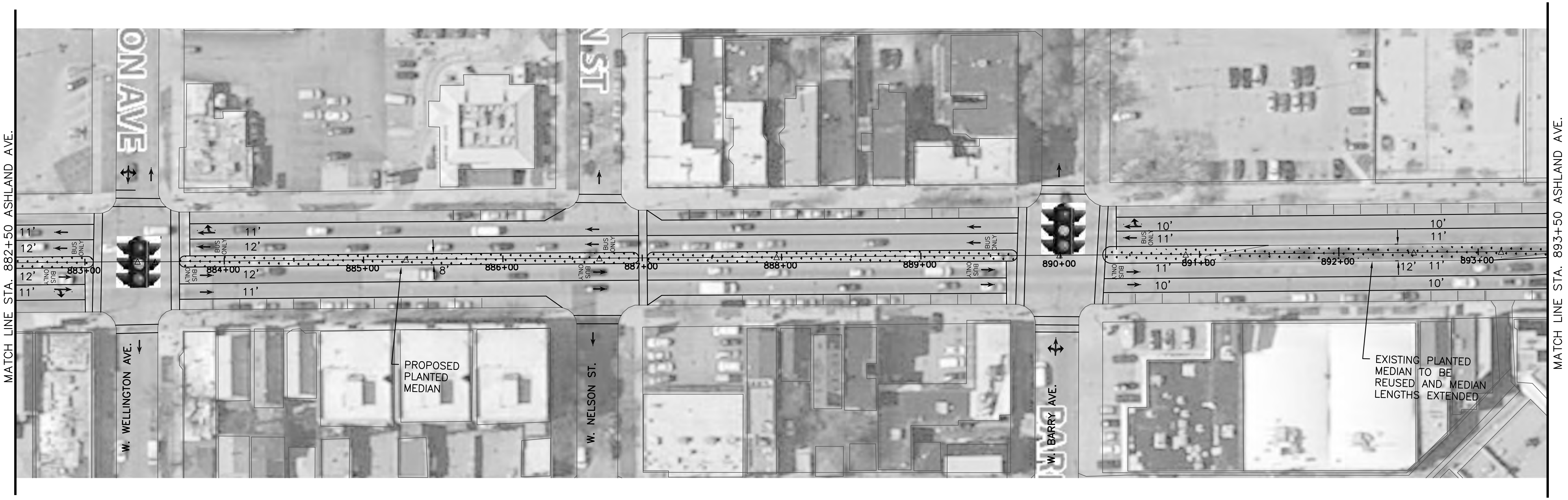

MATCH LINE STA. 871+50 ASHLAND AVE.
872+00
873+00
874+00
875+00
876+00
877+00
878+00
879+00
880+00
881+00
882+00
10'
11'
12'
BUS ONLY
W. WOLFRAM ST.
W. GEORGE ST.
W. OAKDALE AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
MATCH LINE STA. 882+50 ASHLAND AVE.

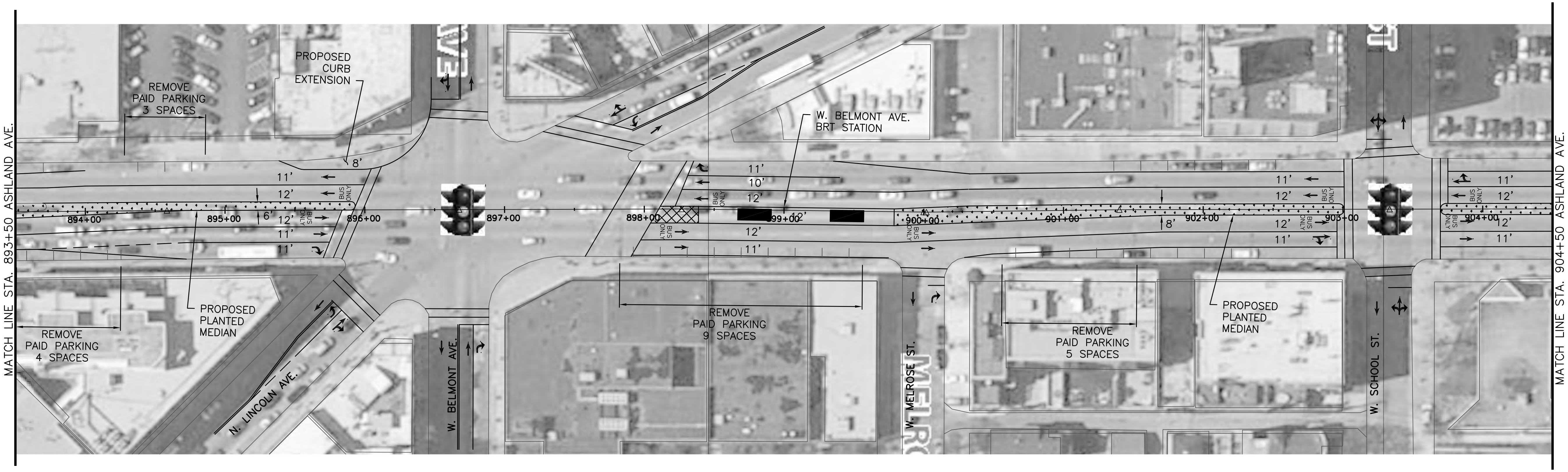
N
0
40
80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 860+50 TO STA. 882+50

ASHLAND AVE. BRT



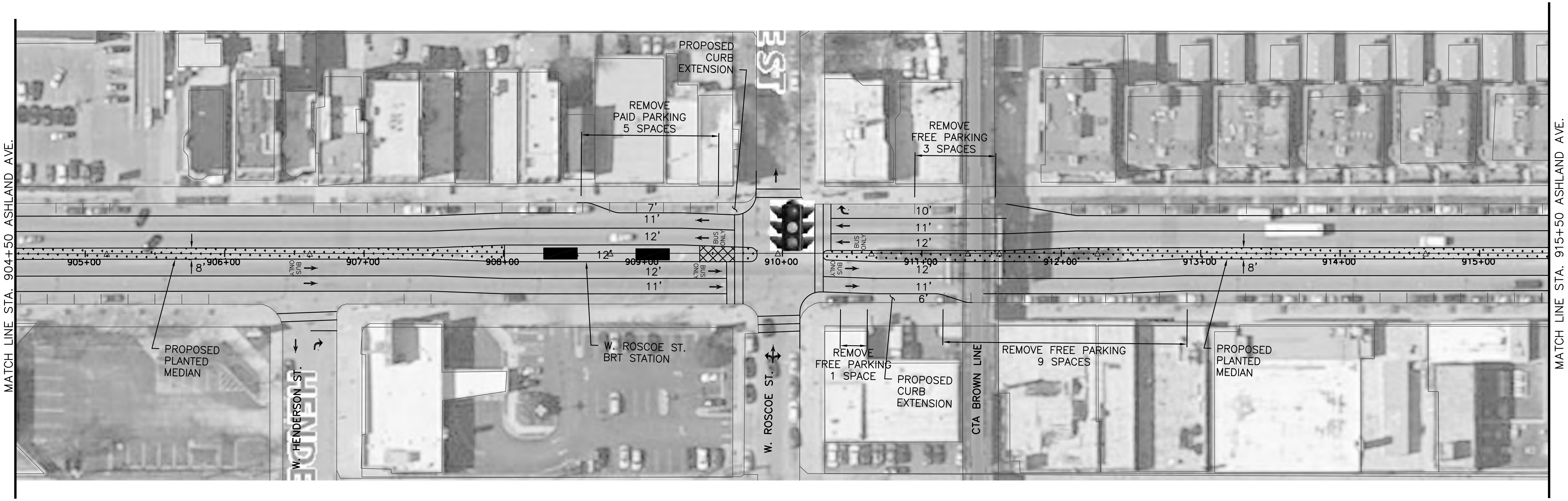


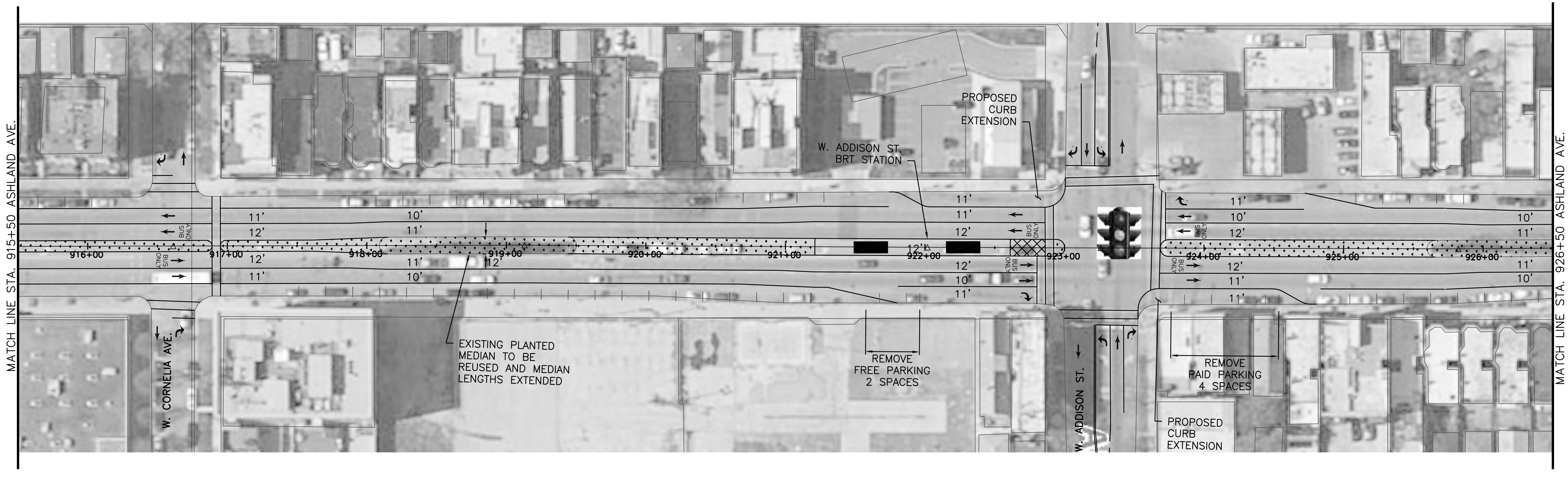
0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 882+50 TO STA. 904+50

ASHLAND AVE. BRT





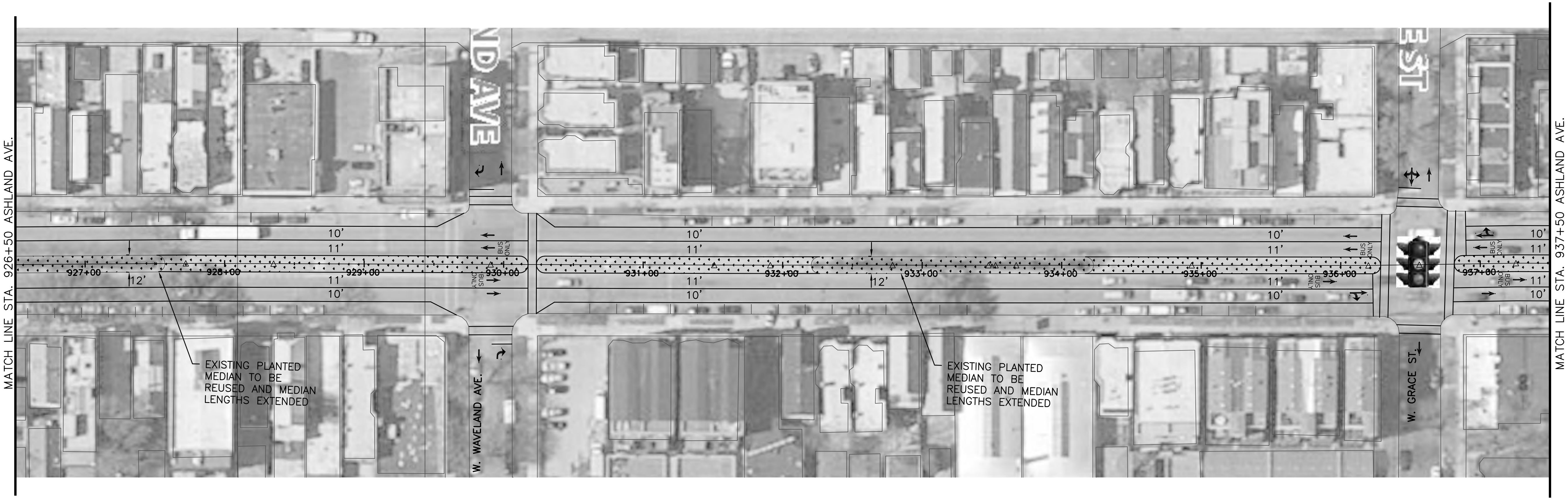
MATCH LINE STA. 915+50 ASHLAND AVE.
11'
12'
10'
11'
12'
11'
11'
11'
12'
12'
10'
11'
11'
10'
12'
12'
11'
10'
BUS ONLY
916+00
917+00
918+00
919+00
920+00
921+00
922+00
923+00
924+00
925+00
926+00
W. CORNELIA AVE.
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. ADDISON ST. BRT STATION
PROPOSED CURB EXTENSION
REMOVE FREE PARKING 2 SPACES
W. ADDISON ST.
REMOVE PAID PARKING 4 SPACES
PROPOSED CURB EXTENSION
MATCH LINE STA. 926+50 ASHLAND AVE.

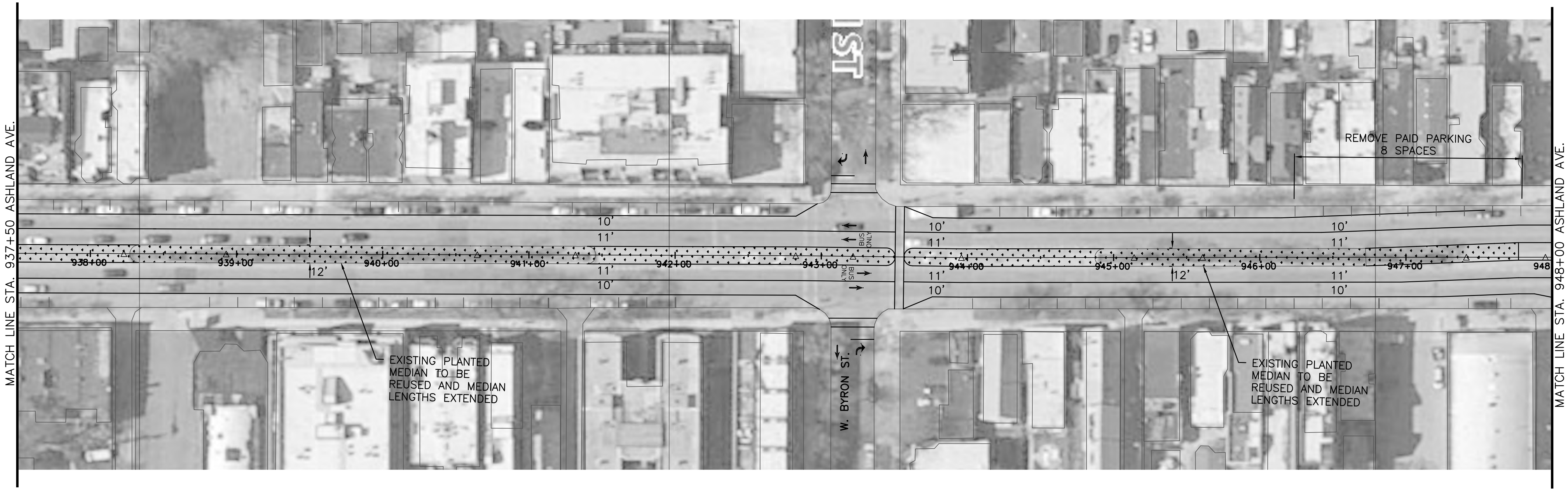
HORIZONTAL SCALE IN FEET
0 40 80

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 904+50 TO STA. 926+50

ASHLAND AVE. BRT


MATCH LINE STA. 926+50 ASHLAND AVE.
ND AVE
ST
10'
11'
12'
927+00
928+00
929+00
930+00
931+00
932+00
933+00
934+00
935+00
936+00
937+00
BUS ONLY
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. WAVELAND AVE.
W. GRACE ST.
MATCH LINE STA. 937+50 ASHLAND AVE.


MATCH LINE STA. 937+50 ASHLAND AVE.
ST
REMOVE PAID PARKING 8 SPACES
10'
11'
12'
938+00
939+00
940+00
941+00
942+00
943+00
944+00
945+00
946+00
947+00
948
BUS ONLY
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
W. BYRON ST.
MATCH LINE STA. 948+00 ASHLAND AVE.

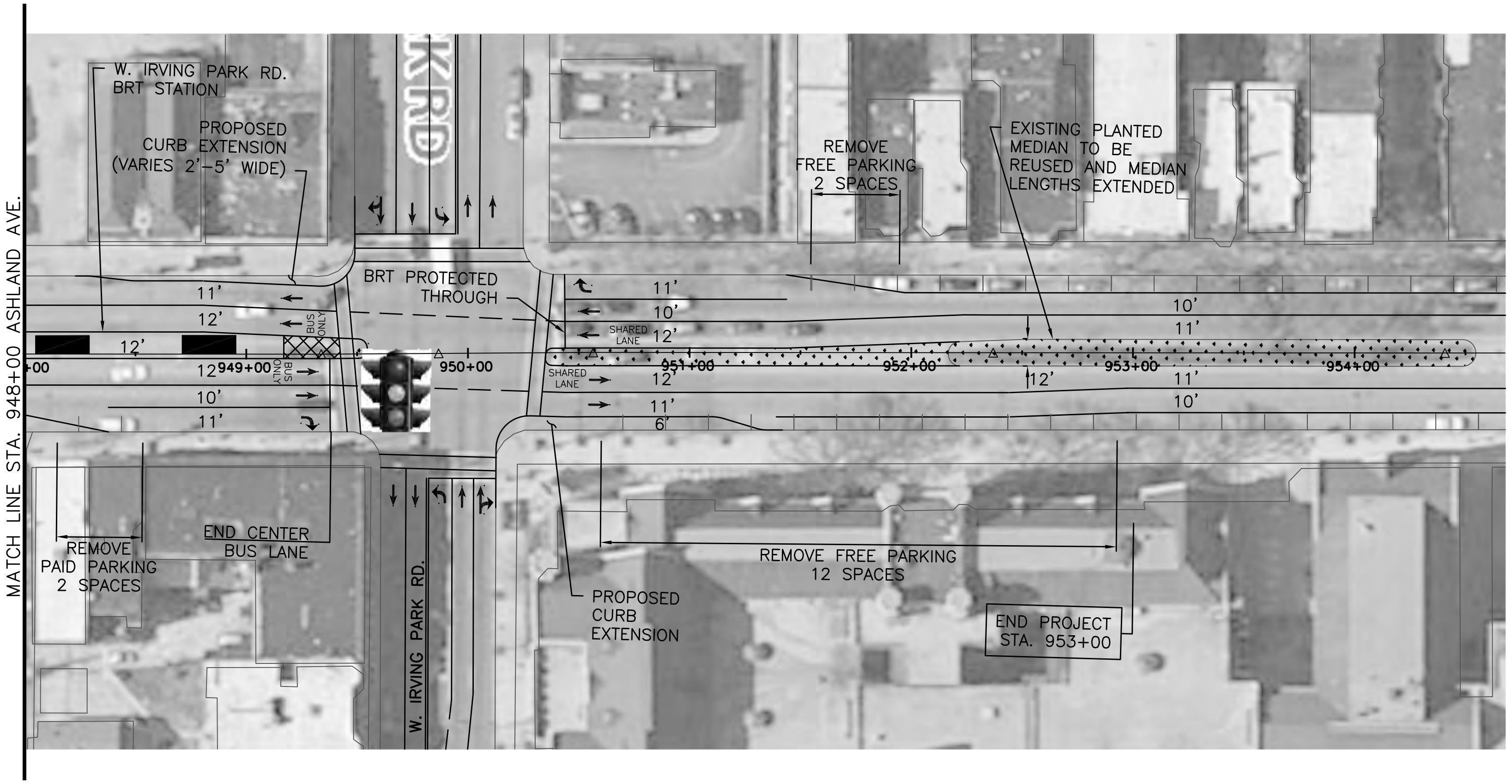
N

0 40 80
HORIZONTAL SCALE IN FEET

CALCULATED SMS
CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 926+50 TO STA. 948+00

ASHLAND AVE. BRT


MATCH LINE STA. 948+00 ASHLAND AVE.
W. IRVING PARK RD. BRT STATION
PROPOSED CURB EXTENSION (VARIES 2'–5' WIDE)
BRT PROTECTED THROUGH
11'
12'
12'
12
949+00
BUS ONLY
BUS ONLY
950+00
10'
11'
SHARED LANE
SHARED LANE
951+00
952+00
953+00
954+00
11'
10'
12'
12'
11'
6'
10'
11'
12'
11'
10'
REMOVE FREE PARKING 2 SPACES
EXISTING PLANTED MEDIAN TO BE REUSED AND MEDIAN LENGTHS EXTENDED
REMOVE PAID PARKING 2 SPACES
END CENTER BUS LANE
W. IRVING PARK RD.
PROPOSED CURB EXTENSION
REMOVE FREE PARKING 12 SPACES
END PROJECT STA. 953+00

N

HORIZONTAL SCALE IN FEET

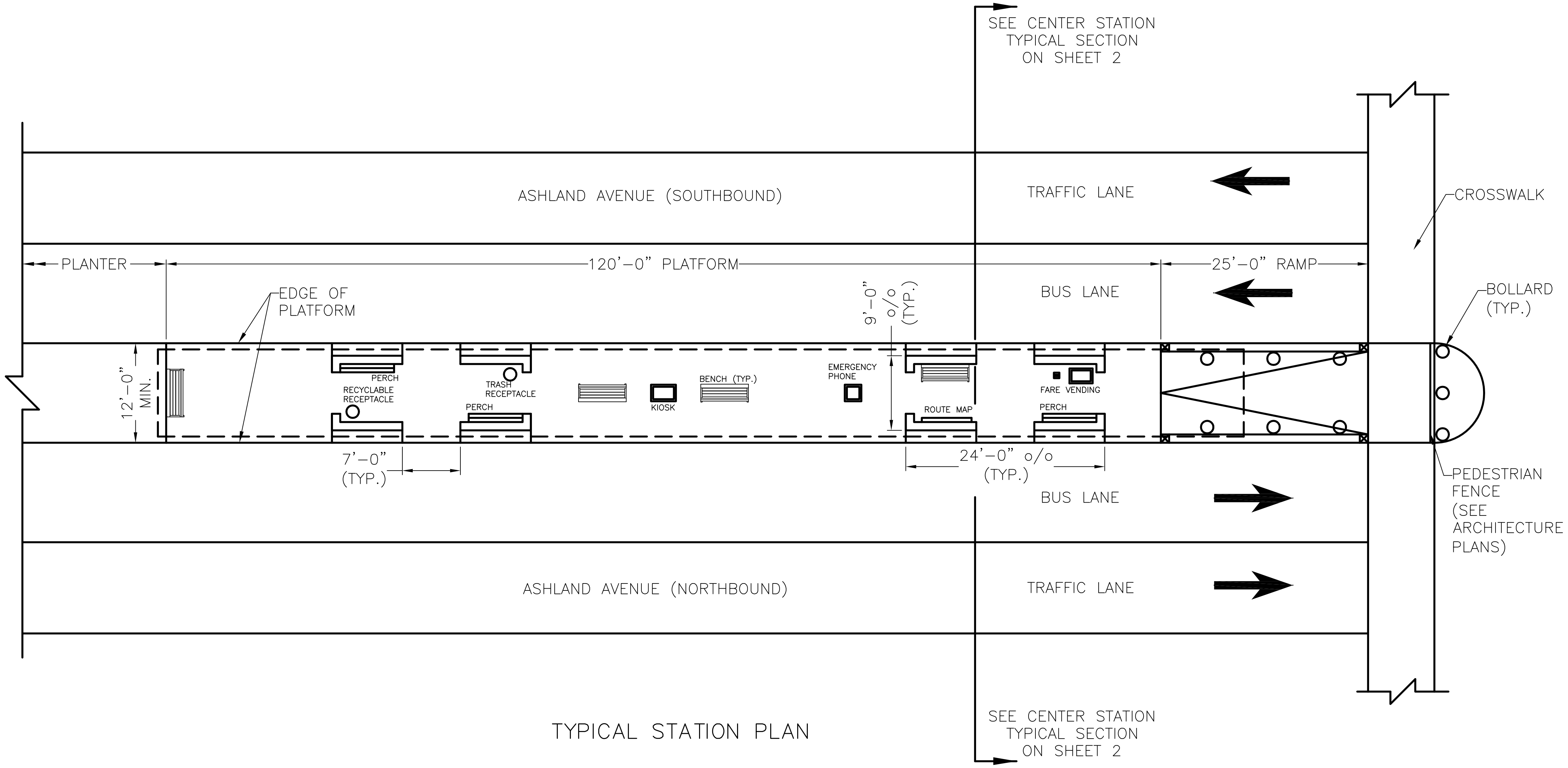
0 40 80

CALCULATED SMS

CHECKED SDG

PLAN – ASHLAND AVENUE
STA. 948+00 TO END

ASHLAND AVE. BRT



TYPICAL STATION PLAN

HORIZONTAL SCALE
IN FEET
0 8 16

CALCULATED SMS
CHECKED SDG

PROTOTYPICAL
CENTER STATION LAYOUT

ASHLAND AVE. BRT

APPENDIX H
Public Involvement

Western/Ashland BRT Public Notification Activities

Community Outreach

Project information was also posted on CTA's Western/Ashland BRT website and social media sites. News releases were also sent to local media outlets.

Meetings with Stakeholders

September 18, 2013 – The Resurrection Project and the Greater Pilsen Economic Development Association

September 18, 2013 – North Branch Works

September 17, 2013 – Chicago Grand Neighbors Association

September 16, 2013 – University Village Association-Little Italy

September 11, 2013 – Illinois Medical District Commission

September 4, 2013 – Wicker Park Committee

August 21, 2013 – Martha Goldstein, West Loop Community Organization (by phone)

August 20, 2013 – Back of the Yards Neighborhood Council

August 5, 2013 – East Village Association

February 20, 2013 – The Industrial Council of Nearwest Chicago

January 24, 2013 – Ashland Avenue-Western Avenue Coalition (Comprising Near West Side Chamber of Commerce, Near West Side Community Development Corporation, Randolph/Fulton Market Association, West Central Association, and West Town Chamber of Commerce); Aldermen in attendance: Representative for Bob Fioretti, 2nd Ward; Representative for Walter Burnett, Jr., 27th Ward; Jason Ervin, 28th Ward; Scott Waguespack, 32nd Ward. State Representative Derrick Smith also in attendance.

August 1, 2012 – Logan Square and Wicker Park Chambers of Commerce

Area Design Meetings

Design meetings were held with community organizations to receive feedback on the proposed alternative. Community leaders were able to comment on conceptual designs of the Ashland roadway geometry specifically within their community. Two rounds were held, the first showing the groups the preferred roadway design and the second displaying modifications that could be incorporated within Final Design.

Second Round Meetings

August 13, 2013 – Pilsen (Comprising Eighteenth Street Development and the Resurrection Project)

July 29, 2013 – Illinois Medical District (Comprising Illinois Medical District Commission)

July 19, 2013 – Kinzie Industrial Corridor (Comprising Industrial Council of Nearwest Chicago and Reliable Plating)

July 17, 2013 – Wicker Park/West Town (Comprising West Central Association, Wicker Park – Bucktown Chamber of Commerce, East Village Association, West Town Chamber of Commerce and Wicker Park Committee)

First Round Meetings

July 8, 2013 – Pilsen II (Comprising Pilsen Neighbors Community Council)

June 26, 2013 – University Village/ Back of the Yards (Comprising University Village Association/Little Italy and Back of the Yards Neighborhood Council)

June 19, 2013 – Illinois Medical District (Comprising Illinois Medical District Commission)

June 19, 2013 – Pilsen I (Comprising Eighteenth Street Development Corporation and the Resurrection Project)

June 18, 2013 – Kinzie Industrial Corridor/West Loop (Comprising Randolph/Fulton Market Association and Rickard Circular Bindery)

June 18, 2013 – Wicker Park/West Town (Comprising West Central Association, Wicker Park-Bucktown Chamber of Commerce, West Town Chamber of Commerce and Wicker Park Committee)

June 18, 2013 – Kinzie Industrial Corridor (Comprising Industrial Council of Nearwest Chicago and North Branch Works)

Public Open House Meetings and Associated Outreach

October 16 – October 18, 2012 Public Open House Meetings

October 16, 2012 – Iglesia Rebaño Church 2435 W. Division St. Chicago, IL 60622
October 17, 2012 – Lindblom Math and Science Academy 6130 S. Wolcott Ave. Chicago, IL 60636
October 18, 2012 – Lane Tech College Prep High School 2501 W. Addison St. Chicago, IL 60618

Postcards
October 1, 2012 – postcards mailed to a list of 823 stakeholders.

Transit cards
October 5, 2012 – transit cards posted on all bus routes
October 10, 2012 – English and Spanish versions of the transit cards posted at selected rail stations

E-Blasts
October 3, 2012 – invitation to upcoming Public Open Houses e-mailed to 424 e-mail addresses of interested parties and individuals

Newspaper Display Advertisements
October 2, 2012 – Hoy
October 3, 2012 – Chicago Sun Times
October 3, 2012 – Chicago Defender
October 3, 2012 – Beverly Review
October 4, 2012 – Evanston Review
October 4, 2012 – Chicago Journal
October 7, 2012 – La Raza

Flyers (Printed in English and Spanish)
For the October Public Open Houses, flyers were mailed to City libraries on database list with a request to post them.

June 12 – June 14, 2012 Public Open House Meetings

June 12, 2012 – 7th District Police Station 1438 W. 63rd St. Chicago, IL 60636
June 13, 2012 – Lane Tech College Prep High School 2501 W. Addison St. Chicago, IL 60618
June 14, 2012 – Wells Community Academy High School 936 N. Ashland Ave. Chicago, IL 60622

Postcards
May 22, 2012 – postcards mailed to a list of 438 stakeholders.

Transit cards
May 23, 2012 – transit cards posted at selected rail stations and on selected bus routes
May 25, 2012 – Spanish version of the transit cards posted at selected rail stations

E-Blasts
May 22, 2012 – invitation to upcoming Public Open House e-mailed to 373 e-mail addresses of interested parties and individuals.

Newspaper Display Advertisements
May 23, 2012 – Chicago Sun Times
May 23, 2012 – Chicago Defender
May 23, 2012 – Beverly Review
May 24, 2012 – Hoy
May 24, 2012 – Chicago Journal
May 25, 2012 – Our Village
May 27, 2012 – La Raza
May 31, 2012 – Evanston Review

Flyers (Printed in English and Spanish)
June 5, 2012 – Active Transportation Alliance (ATA) passed out flyers at Western stop on Pink Line
June 7, 2012 – ATA passed out flyers at Western stop on Brown Line
June 11, 2012 – ATA passed out flyers at Ashland stop on Green Line
June 12, 2012 – ATA passed out flyers at Western stop on Blue Line, O'Hare branch
Flyers also mailed to select City libraries with a request to post them.

Elected Officials Briefings

July 2013 Outreach

Meetings with Aldermen:

- July 10, 2013 – Ald. Daniel Solis, 25th Ward

June 2013 Outreach

Meetings with Aldermen:

- June 17, 2013 – Ald. Walter Burnett, 27th Ward
- June 24, 2013 – Ald. Jason Ervin, 28th Ward

February 2013 Outreach

Meetings with Aldermen:

- February 11, 2013 – Ald. Debra Silverstein, 50th Ward
- February 20, 2013 – Ald. Lona Lane, 18th Ward

October 2012 Outreach

Meetings with Aldermen:

- October 2, 2012 – staff of Ald. Thomas Tunney, 44th Ward
- October 9, 2012 – Ald. Walter Burnett, 27th Ward
- October 10, 2012 – Ald. Willie Cochran, 20th Ward
- October 10, 2012 – Ald. Debra Silverstein, 50th Ward
- October 11, 2012 – staff of Ald. Roberto Maldonado, 26th Ward
- October 16, 2012 – Ald. George Cardenas, 12th Ward
- October 16, 2012 – Ald. Scott Waguespack, 32nd Ward
- October 17, 2012 – staff of Ald. Daniel Solis, 25th Ward
- October 23, 2012 – Ald. Proco Joe Moreno, 1st Ward

The following aldermen were also contacted and offered briefings:

- Ald. Robert Fioretti, 2nd Ward
- Ald. Pat Dowell, 3rd Ward
- Ald. James A. Balcer, 11th Ward
- Ald. Ed Burke, 14th Ward
- Ald. Toni Foulkes, 15th Ward
- Ald. JoAnn Thompson, 16th Ward
- Ald. Latisha Thomas, 17th Ward
- Ald. Lona Lane, 18th Ward
- Ald. Matthew O'Shea, 19th Ward
- Ald. Howard B. Brookins Jr., 21st Ward
- Ald. Jason Ervin, 28th Ward
- Ald. Carrie M. Austin, 34th Ward
- Ald. Patrick J. O'Conner, 40th Ward
- Ald. James Cappleman, 46th Ward
- Ald. Ameya Pawar, 47th Ward
- Ald. Harry Osterman, 48th Ward
- Ald. Joseph A. Moore, 49th Ward

May/June/July 2012 Outreach

Meetings with Aldermen:

- May 23, 2012 – Ald. James A. Balcer, 11th Ward
- May 25, 2012 – Ald. Daniel Solis, 25th Ward
- May 29, 2012 – Ald. Roberto Maldonado, 26th Ward
- May 31, 2012 – Ald. James Cappleman, 46th Ward
- May 31, 2012 – Ald. Willie Cochran, 20th Ward
- June 4, 2012 – Ald. George Cardenas, 12th Ward
- June 5, 2012 – Ald. Carrie M. Austin, 34th Ward
- June 5, 2012 – Ald. Toni Foulkes, 15th Ward
- June 7, 2012 – Ald. JoAnn Thompson, 16th Ward
- July 2, 2012 – Ald. Matthew O'Shea, 19th Ward
- July 3, 2012 – Ald. Walter Burnett, 27th Ward

The following aldermen were also contacted and offered briefings:

- Ald. Proco Joe Moreno, 1st Ward
- Ald. Robert Fioretti, 2nd Ward
- Ald. Pat Dowell, 3rd Ward
- Ald. Ed Burke, 14th Ward
- Ald. Latisha Thomas, 17th Ward
- Ald. Lona Lane, 18th Ward
- Ald. Howard B. Brookins Jr., 21st Ward
- Ald. Jason Ervin, 28th Ward
- Ald. Scott Waguespack, 32nd Ward
- Ald. Patrick J. O'Conner, 40th Ward
- Ald. Thomas Tunney, 44th Ward
- Ald. Ameya Pawar, 47th Ward
- Ald. Harry Osterman, 48th Ward
- Ald. Joseph A. Moore, 49th Ward
- Ald. Debra Silverstein, 50th Ward

Non-CTA-led Outreach

Active Transportation Alliance (Active Trans)

For the October 2012 Public Open Houses, Active Trans contacted interest groups, posted information on their organization's social media pages, and provided infographic information to the media.

Metropolitan Planning Council (MPC)

For the October 2012 Public Open Houses, MPC communicated information via social media and sent letters to 40 property owners along the corridor.

MPC also reached out to the following Aldermen:

- December 8, 2011 – Ald. Joseph A. Moore, 49th Ward
- December 8, 2011 – Ald. Willie Cochran, 20th Ward
- January 10, 2012 – Ald. Toni Foulkes, 15th Ward
- January 13, 2012 – Ald. Howard B. Brookins Jr., 21st Ward
- January 17, 2012 – Ald. Latasha Thomas, 17th Ward
- January 23, 2012 – Ald. James Balcer, 11th Ward
- January 25, 2012 – Ald. Joe Moreno, 1st Ward
- January 25, 2012 – Ald. Scott Waguespack, 32nd Ward
- January 27, 2012 – Ald. James Cappelman, 46th Ward
- February 1, 2012 – Ald. Walter Burnett, 27th Ward
- February 1, 2012 – Ald. Debra Silverstein, 50th Ward
- February 16, 2012 – Ald. Danny Solis, 25th Ward
- February 22, 2012 – Ald. Ameya Pawar, 47th Ward
- March 27, 2012 – Ald. Lona Lane, 18th Ward

A briefing was also held on February 22, 2012 at the 1st Ward Community Meeting.

MPC and Active Trans Meetings

MPC and Active Trans also worked with Local Initiatives Support Corporation (LISC) to meet with a number of members of their New Communities Partnership lead agencies, which took place on April 23, 2012. Beyond efforts to schedule individual meetings with the community organizations listed below, all were invited to attend one of the following three BRT sessions:

- May 24, 2012 (25th Ward presented by ATA with Alderman Solis)
- May 30, 2012 at Active Trans
- January 10, 2012 – Ald. Toni Foulkes, 15th Ward

The following table lists each community organization that MPC and Active Trans reached out to. While MPC/Active Trans has met with 31 of these organizations, every organization listed below has been called, emailed, and has received informational materials about BRT and the Western/Ashland Avenues Alternatives Analysis public meetings hosted by CTA and CDOT.

MPC and Active Trans met with the following 31 Organizations:

- 17th Ward Community Redevelopment Advisory Council
- Back of the Yards
- Bickerdike Redevelopment Corporation
- Edgewater Chamber of Commerce
- Enlace

- Greater Auburn-Gresham Development Corp.
- Greater West Town Community Development Project
- Humboldt Park LISC*
- ICNC
- Lakeview Chamber of Commerce
- Lincoln Bend Chamber of Commerce
- Lincoln Square Chamber of Commerce
- LISC/MetroEdge
- March 27, 2012 – Ald. Lona Lane, 18th Ward
- Little Village LISC
- Logan Square Chamber of Commerce
- Logan Square Neighborhood Association
- LVEJO
- Mercy Housing
- Near West Side Chamber of Commerce
- Near West Side Community Development Corp.
- North Center Chamber
- North River Commission
- Rogers Park Business Alliance
- Southwest Organizing Project
- Teamwork Englewood
- Washington Park Consortium
- West Central Association
- West Ridge Chamber of Commerce
- West Town Chamber of Commerce
- Wicker Park & Bucktown Chamber of Commerce

Organization listed below did not meet with MPC / Active Trans; however, they have been called, emailed, and received informational materials about BRT and the Western/Ashland Avenues Alternatives Analysis public meetings hosted by CTA and CDOT.

- 95th Street Beverly Hills Business Association
- Alevio Clinic
- Beverly Area Planning Association
- Canaryville Improvement Association
- Catholic Charities
- Chinatown Centennial Committee
- Chinese Chamber of Commerce
- Cristo Rey High School
- Division Street Business Development Association
- EcoAndersonville
- Friends of Holstein Park
- Greater Northwest Chicago Development Corporation
- Greater Southwest Development Corporation
- Instituto

- Interfaith Organizing Project
- Juarez High School
- Lakeview High School
- Little Village Chamber of Commerce
- Mujeres Latinas en Accion
- Near Northwest Neighborhood Network
- North Side Alliance
- Northwest Corridor Business Organization
- Pilsen "Together" Chamber of Commerce
- Puerto Rican Chamber of Commerce of Illinois
- The Resurrection Project
- Tri-Taylor Chamber of Commerce in Little Italy
- Universidad Popular
- UNO
- West Andersonville Neighbors Together
- West Bucktown Neighborhood Association
- West Edgewater Area Residents
- West Lakeview Neighborhood Association
- West Loop Gate
- West Rogers Park Community Organization

Chicago Architectural Foundation (CAF)

October 17, 2012 – CAF hosted a Lunchtime BRT Lecture.
June 6, 2012 – CAF hosted an Evening BRT Panel Discussion.
May 14, 2012 – CAF opened Lecture Hall Exhibit on BRT to the Public.
April 25, 2012 – CAF hosted a BRT 101 Lunchtime Lecture with MPC's Peter Skosey.

Media Summary

The following lists all media pertaining to Ashland BRT. This includes online and print publications as well as television and radio reports.

October 4, 2013 – StreetsBlog, "Residents Respond to West Town Chamber of Commerce's Anti-BRT Stance," John Greenfield

October 3, 2013 – ChicagoNow - Getting Real, "In A Nutshell...Why The Ashland Bus Rapid Transit Plan Is Insane," Gary Lucido

October 3, 2013 – StreetsBlog, "Join Us for the Ashland BRT Advocate Social and Pub Stroll on October 15," John Greenfield

October 1, 2013 – Wired, "To Attract Urban Investment, Build a Bus Line," Keith Barry

September 30, 2013 – StreetsBlog, "While Pawar Leads on BRT, Waguespack and Cardenas Hem and Haw," John Greenfield

September 30, 2013 - Chicago Tribune, “Getting Around: Bus rapid transit for Ashland Avenue hits road bump in Chicago,” Jon Hilkevitch

September 24, 2013 – StreetsBlog, “Talking to a Concerned Mom About How Ashland BRT Will Improve Safety,” John Greenfield

September 20, 2013 - Chicago Sun-Times, “Cutting lanes on Ashland a really bad idea,” Herb Gould

September 19, 2013 – StreetsBlog, “Sun-Times Editorial Writer Gets BRT, Even If Its Transpo Reporter Doesn’t,” John Greenfield

September 19, 2013 – StreetsBlog, “Have No Fear, Ashland Residents, BRT Is a Good Fit for City Neighborhoods,” Kristen Maddox

September 18, 2013 - Chicago Sun-Times, “Rapid transit buses not there yet,” Greg Borzo

September 18, 2013 - WMAQ-TV Channel 5 (NBC), “Rapid Transit System Proposed For Ashland,” Regina Waldroup

September 17, 2013 - Chicago Sun-Times, “Backers of Ashland bus rapid transit plan object to left-turn ban,” Rosalind Rossi

September 17, 2013 - WLS-TV Channel 7 (ABC), “Ashland bus-only lane proposed from Irving Park to 95th Street,” Eric Horng

September 16, 2013 - Chicago Sun-Times, “North Side residents question CTA plan for bus rapid transit on Ashland,” Rosalind Rossi

September 16, 2013 – StreetsBlog, “The Ashland-Western Coalition Meets a Car-Owning, Pro-BRT Chicagoan,” John Greenfield

September 15, 2013 – Forbes, “Bus Rapid Transit Spurs Development Better Than Light Rail Or Streetcars: Study,” Jeff McMahon

September 8, 2013 - Lincoln Square Patch, “CTA Makes Case for BRT, Critics Call it a 'Glorified Ashland Express Bus,'” Andy Ambrosius

September 6, 2013 – StreetsBlog, “Quigley Hosts Roundtable on Sustainable Transportation in Chicago Region,” John Greenfield

September 6, 2013 - NorthCenter-RoscoeVillage Patch, “CTA Makes Case for BRT, Critics Call it a 'Glorified Ashland Express Bus,'” Andy Ambrosius

September 5, 2013 - Curbed Chicago, “CTA Presents Case (w/ Facts) for Ashland Bus Rapid Transit,” Ian Spula

September 5, 2013 – DNAinfo, “City Makes Case for Ashland Express Bus Project,” Darryl Holliday

September 4, 2013 – StreetsBlog, "Debating Bus Rapid Transit With the Ashland-Western Coalition," Lindsay Bayley

September 3, 2013 – StreetsBlog, "Deconstructing the Misleading Info in an Ashland-Western Coalition Flyer, "John Greenfield

August 21, 2013 – StreetsBlog, "Ashland Bus Rapid Transit NIMBYs Cling to Anonymity," John Greenfield

August 16, 2013 - Lake View Patch, "Petition Created to Keep BRT off Ashland, Western," Andy Ambrosius

August 13, 2013 - Chicago Now-CTA Tattler, "Coalition fears no left turns in opposing Ashland BRT," Kevin O'Neil

August 9, 2013 – StreetsBlog, "Chicago Already Has a "Traffic Disaster – Transit and Bikes Are the Solution," John Greenfield

August 9, 2013 - Chicago Tribune, "The creation of a traffic disaster," John McCarron

August 8, 2013 - Lincoln Square Patch, "Ashland-Western Coalition Calls for 'Sensible Bus Improvements' in Lieu of BRT," Dani Chung and Carrie Frillman

August 7, 2013 – StreetsBlog, "Don't Be Fooled: Ashland-Western Coalition Is Against "Modern" Bus Service," John Greenfield

August 6, 2013 – DNAinfo, "Ashland Express Bus: Left Turn Reductions, Truck Traffic Raise Concerns," Alisa Hauser

August 2, 2103 - The Gazette, "Business owners question BRT practicality as project continues," Jane Lawicki

July 31, 2013 – StreetsBlog, "Chicago Can Do Much More to Legalize Transit-Oriented Development," Steven Vance

July 31, 2013 – StreetsBlog, "Emanuel: BRT Part of the 'Modernization' of Chicago Transit," John Greenfield

July 26, 2013 – StreetsBlog, "Survey: Most Chicagoans Support Bus Rapid Transit," John Greenfield

July 15, 2013 – Chicagoist, "Pawar Supports Bus Rapid Transit As Group Calls It A 'Cheap L Train,'" Chuck Sudo

July 15, 2013 - DNAinfo Chicago, "Ashland Express Bus Opposed by Local Group as 'Cheap L Train,'" Kayla Gardner

July 11, 2013 – StreetsBlog, "Alderman Pawar: "I Can't Wait for Ashland BRT," John Greenfield

July 2, 2013 - DNAinfo.com, “Ashland Express Bus: Center Lane Project Raises Questions, Concerns,” Alisa Hauser

June 27, 2013 – StreetsBlog, “Ashland Bus Rapid Transit NIMBYs Try to Win Over Aldermen,” John Greenfield

June 25, 2013 – StreetsBlog, “Check Out MPC’s New Video Introducing Bus Rapid Transit to Chicagoans,” John Greenfield

June 24, 3013 – StreetsBlog, “Talking Transportation With Alderman Bob Fioretti,” John Greenfield

June 24, 2013 - Crain’s Chicago Business, “Reconsider BRT,” Letter to the Editor by Jim Greenwell, president, Reliable Plating Corp. and Steve Debretto, Executive director, Industrial Council of Nearwest Chicago

June 11, 2013 – Chicagoist, “Opposition Grows To Ashland Avenue Bus Rapid Transit Project,’ Chuck Sudo

June 10, 2013 – StreetsBlog, “NIMBYs Fear Ashland BRT, Propose Watered-Down Express Bus Alternative,” John Greenfield

June 7, 2013 - The Gazette, “Bus Service Coalition proposes alternative to Bus Rapid Transit on Ashland Avenue,” Jane Lawicki

June 6, 2013 - Chicago Weekly, “The CTA plans for bus rapid transit on Ashland Avenue,” Jamison Pfeifer

May 23, 2013 – StreetsBlog, “New York’s Experience Shows Ashland Bus Lanes Won’t Cause Carmaggedon,” Steven Vance

May 17, 2013 – StreetsBlog, “Businesses Win When Cars and Parking Give Way to Peds, Bikes, and Transit,” Steven Vance

May 3, 2013 - The Gazette, “RFMA wants changes in street designs and in truck bans in area,” Dermot Connolly

May 2, 2013 - Scene Magazine, “Chicago Totally Copying Cleveland with Planned Bus Rapid Transit,” Sam Allard

May 1, 2013 - WTTW-TV “Chicago Tonight,” “Bus Rapid Transit,” Eddie Arruza

April 25, 2013 - Human Transit blog, “Chicago: bus rapid transit moves forward,” Jarrett Walker

April 25, 2013 - Chicago Tribune - Letter to the Editor, “Bus rapid transit a win for aging population,” Bob Gallo, AARP Illinois State Director

April 22, 2013 - RedEye blog, “Get ready for bus rapid transit,” Tracy Swartz

April 22, 2013 – Patch, “Ashland Avenue Chosen for 'Rail-Like' Bus Route,” Sarah Flagg

April 19, 2013 – Chicagoist, “City Approves Ashland Avenue Bus Rapid Transit Plan,” Chuck Sudo

April 19, 2013 - Chicago Sun-Times, “City officials, CTA propose Bus Rapid Transit on Ashland,” Rosalind Rossi

April 19, 2013 - eNews Park Forest, “Mayor Emanuel, CTA and CDOT Announce Next Steps in Pursuit of Bus Rapid Transit on Ashland Avenue”

April 19, 2013 - Crain’s Chicago Business, “Bus rapid transit coming to Ashland Avenue,” Greg Hinz

April 19, 2013 - WLS-AM 890, “Ashland chosen as city's first bus rapid transit corridor”

April 19, 2013 - Red Eye, “CTA details proposed Ashland express bus service,” Tracy Swartz

April 19, 2013 - Chicago Tribune, “Chicago picks Ashland Avenue for next bus rapid transit corridor,” Jon Hilkevitch

April 19, 2013 – DNAinfo, “Ashland express bus route gets greenlight from CTA,” Tanveer Ali

April 19, 2013 - WBEZ-FM 91.5, “Bus rapid transit to “maximize potential” of Ashland Avenue,” Chip Mitchell

April 19, 2013 - Chicago Sun-Times Media Wire, “Ashland chosen as city’s first bus rapid transit corridor”

APPENDIX I
List of Acronyms

List of Acronyms

AA	Alternatives Analysis
ADA	Americans with Disabilities Act of 1990
APE	Area of Potential Effect
BRT	Bus Rapid Transit
CAA	1970 Clean Air Act
CBD	Central Business District
CCDOTH	Cook County Department of Transportation and Highways
CDOT	Chicago Department of Transportation
CFR	Code of Federal Regulations
CHRS	Chicago Historic Resources Survey
CMAP	Chicago Metropolitan Agency for Planning
CO	Carbon Monoxide
CSSC	Chicago Sanitary and Ship Canal
CTA	Chicago Transit Authority
dB	Decibel
dBA	A-Weighted Decibel
DHED	Chicago Department of Housing and Economic Development
EA	Environmental Assessment
EcoCAT	Ecological Compliance Assessment Tool
EDR	Environmental Data Resources
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
HARGIS	Historic Architectural Resources Geographic Information System
HPMS	Highway Performance Monitoring System
IDNR	Illinois Department of Natural Resources
IDOT	Illinois Department of Transportation
IEPA	Illinois Environmental Protection Agency
IHPA	Illinois Historic Preservation Agency
ILCS	Illinois Compiled Statutes
IMD	Illinois Medical District
ITDP	Institute for Transportation and Development Policy
Ldn	Day-Night Average Sound Level
LEP	Limited English Proficiency
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
MOPD	Mayor's Office for People with Disabilities
MOVES	Motor Vehicle Emission Simulator
MPH	Miles per Hour
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O_3	Ozone
OSHA	Occupational Safety and Health Administration

Pb	Lead
$PM_{2.5}$	Particulate Matter (diameter of 2.5 micrometers or less)
PM_{10}	Particulate Matter (diameter of 10 micrometers or less)
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
TAZ	Traffic Analysis Zone
TIF	Tax Increment Financing
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TOD	Transit-Oriented Development
TSM	Transportation Systems Management
TSP	Transit Signal Priority
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
V/C	Volume to Capacity Ratio
VMT	Vehicle Miles Traveled
VHT	Vehicle Hours Traveled